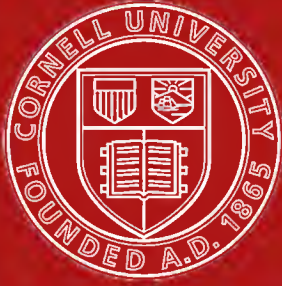


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TIGRIDIA PAVONIA ALBA.









THE  
ILLUSTRATED  
DICTIONARY OF GARDENING,

A PRACTICAL AND SCIENTIFIC

*Encyclopædia \* of \* Horticulture*

FOR

GARDENERS AND BOTANISTS.

---

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PLANT STRUCTURE, HORTICULTURAL CHEMISTRY, &c.; AND J. GARRETT IN THE FRUIT,  
VEGETABLE, AND GENERAL GARDEN WORK PORTIONS.

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# REFERENCE TO ILLUSTRATIONS OF PLANTS OTHER THAN THOSE FIGURED IN THIS WORK.

IT has been suggested, by an eminent Authority, that many readers would be glad to be informed where reliable Illustrations could be found of those Plants which are not figured in this Work. To meet this want, references to the figures in Standard Authorities have been given, the titles of the Works referred to being, for economy of space, abbreviated as follows:

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\* Is still in course of publication.



**Sclerotia**—*continued*.

several are formed on living plants. Among these are the following: In Potato stems, the Sclerotium from *Peziza postuma* is produced; on most herbaceous stems *S. durum* appears in long, black ridges or warts, from which arises a mould (*Polyactis cinerea*), followed, after a time, by *Peziza Fuckeliana*; *S. cepavorum*, which produces *Mucor subtilissimus* on Onions; *S. clavus*, the Ergot of grasses, from which *Claviceps purpurea* is developed; and a Sclerotium which fills the berries of *Vaccinium Myrtillus*, and gives origin to *Peziza (Sclerotinia) baccarum*. Sclerotia are not themselves a cause of disease in plants, but are organs by which disease-producing Fungi are propagated. When any cultivated plants are attacked by Fungi that produce Sclerotia, the only safe method of treatment is to burn all parts that bear the latter, to prevent the spread of disease the following year.

**SCLEROXYLON.** A synonym of **Myrsine** (which see).

**SCOBIFORM.** Resembling sawdust.

**SCOLIOSORUS.** Included under *Antrophyum*.

**SCOLOCHLOA.** A synonym of *Arundo*.

**Scolopendrium**—*continued*.

pairs of similar lateral ones; veins usually once forked. *sori* oblique,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, one line broad. Philippines. Greenhouse.

**S. rhizophyllum** (rooting-fronded). *sti.* lin. to 4 in. long, naked, compressed, chestnut-brown below. *fronds* 4 in. to 9 in. long, lanceolate, from an auricled cordate base, the point tapering out, and frequently rooting. *sori* short, irregular, linear-oblong. North America. See Fig. 452.

**S. vulgare** (common). Burnt Weed; Christ's Hair; Common Hartstongue. *rhiz.* very stout, often scaly (as well as the stipes and midrib). *sti.* very stout, 4 in. to 8 in. long. *fronds* 6 in. to 18 in. long, broadest in the middle, flaccid, bright green; basal lobes usually auricled, converging; margins undulated; midrib stout. *sori* parallel, at right angles to the midrib, very variable in length and number. Europe (Britain). SYN. *S. officinarum*.

The following are some of the best marked varieties of this species:

**S. v. acrocladon** (branch-tipped). *fronds* very distinct, narrow-linear, crested and branched at the apex.

**S. v. claphamii** (Clapham). *fronds* forked and crested at the apex, lacinate and lobed on the margins.

**S. v. columnare** (columnar). *fronds* having the rachis fringed with a narrow, wing-like membranous, leaving only a dense, multifold head. *h.* 6 in.

**S. v. Coolingii** (Cooling's). A form about 4 in. broad and high, much branched. The plant is almost spherical in shape.

**S. v. crispum** (curled). *fronds* 1 ft. to 1½ ft. long, always barren under cultivation; margins crenated and undulated, imparting a

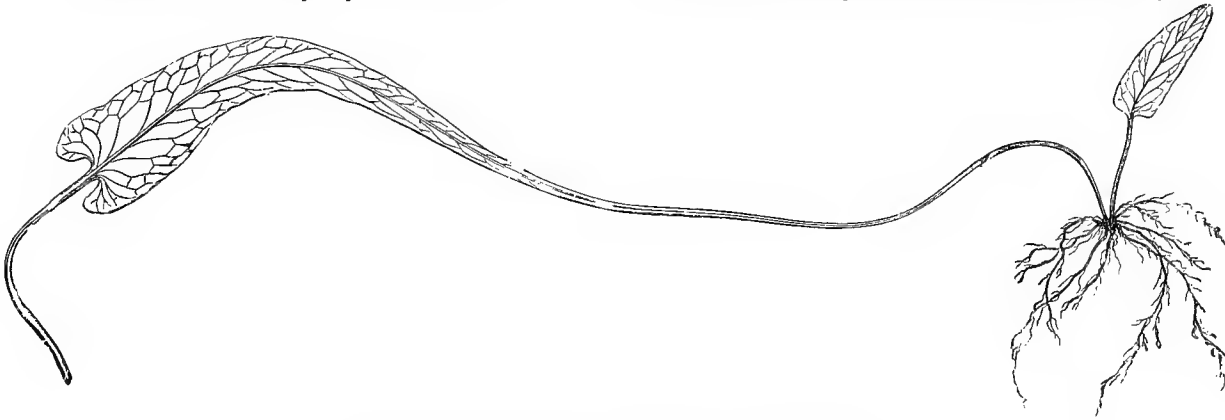


FIG. 452. ROOTING FROND OF SCOLOPENDRIUM RHIZOPHYLLUM.

**SCOLOPENDRIUM** (the ancient Greek name of the genus, used by Theophrastus; it was said to be so-called because the numerous parallel lines of fruit resemble the feet of the Centipede, or *Scolopendra*). Hartstongue. Including *Antigramme*, *Camptosorus*, and *Schaffneria*. ORD. *Filices*. A genus comprising about nine species of interesting, stove, greenhouse, or hardy ferns, inhabiting temperate and tropical regions. *Sori* attached to the veins, oblique with regard to the midrib, or occasionally almost parallel with it, linear or oblong; involucres arranged in pairs, and open towards each other. The species thrive on rockwork; they will also succeed in shady situations, where scarcely any other plant would live. Of *S. vulgare*, the common British Hartstongue, a multitude of varieties are grown in gardens, and present a wonderful series of interesting variations from the normal state of the plant. The best known species and varieties are described below; except where otherwise indicated, all are hardy. For general culture, see **Ferns**.

**S. Hemionitis** (Hemionites-like). Mule's Fern. *sti.* 4 in. to 6 in. long, slender, slightly fibrillose. *fronds* 4 in. to 6 in. long, oblong-lanceolate, hastate-cordate at base, with short and rounded, or prominent and almost acute, lobes. South Europe, 1779.

**S. Krebsii** (Krebs'). A form of *Lonaria punctulata*.

**S. officinarum** (official). A synonym of *S. vulgare*.

**S. pinnatum** (pinnate). *sti.* compressed, greyish. *fronds* 2 ft. to 4 ft. long, with an entire terminal pinna, 4 in. to 6 in. long, and 1½ in. to 2 in. broad, proliferous at the point, and one to six

handsome, frilled appearance. There are many forms of this variety, the most important of which are: *fertile*, *latum*, and *minus*.

**S. v. cristatum** (crested). *fronds* branched at the apex, the branches again forked, thus forming a large crest. See Fig. 453.



FIG. 453. SCOLOPENDRIUM VULGARE CRISTATUM.

The form *lato-digitatum* has digitately-branched fronds, and irregularly-lacinate and wavy divisions. See Fig. 454.



**Scolopendrium**—continued.

**S. v. densum** (dense). A remarkable form, about 3in. high, having the fronds very much branched, so that the plant resembles a green ball, studded over with innumerable points, something like curled parsley. 1882.

**S. v. laceratum** (torn). *fronds* beautifully crested and curled at the tips, forming large, crisp heads.



FIG. 454. FROND OF SCOLOPENDRIUM VULGARE LATO-DIGITATUM.

**S. v. marginatum** (margined). *fronds* about 1ft. long, having on the under side, near the margin, a continuous, raised line, which often produces thorn-like processes. A very elegant and distinct variety.

**S. v. multifidum** (much-cut). *fronds* much-branched and forked at the apex, forming a very handsome, crested head.

**S. v. Stansfieldii** (Stansfield's). This mainly differs from *crispum* in that the fronds are peculiarly fringed on the edges and crested at the apex. It is a very striking variety.

**SCOLYMUS** (the old Greek name, used by Theophrastus and other writers as far back as Hesiod). ORD. *Compositæ*. A small genus (three species) of hardy, erect, annual, biennial, or perennial herbs, natives of the Mediterranean region. Flower-heads yellow, terminal or lateral, sessile; involucre ovoid or sub-globose, the few-seriate bracts mucronate or spiny at apex, gradually passing into floral leaves; receptacle conical or elongated; florets ligulate, truncately five-toothed at apex. Leaves alternate, rigid, sinuate-toothed or pinnatifid, with spiny teeth or lobes, often white-spotted above. The roots of *S. hispanicus* are equally as good as *Scorzonera*; the leaves and stalks are eaten as Cardoons by the people of Salamanca; the flowers are employed for the adulteration of Saffron. *S. maculatus* is sometimes cultivated for the sake of its spotted, variegated leaves; seeds of this species only require sowing in the open ground. The perennial and biennial species thrive in common soil, and may be increased by seeds, or by divisions.

**S. grandiflorus** (large-flowered)\*. *fl.-heads* solitary, usually terminal; bracts sub-verticillate. May. *l.* slightly villous, decurrent, winged. Stem villous. *h.* 3ft. Mediterranean region, 1828. Perennial.

**S. hispanicus** (Spanish). Golden Thistle; Spanish Oyster Plant. *fl.-heads* bibracteate, sub-aggregate, in leafy spikes. August. *l.* decurrent, slightly glabrous, winged. *h.* 3ft. South-west Europe, 1653. Biennial. (S. F. G. 825.)

**Scolymus**—continued.

**S. maculatus** (spotted). *fl.-heads* somewhat corymbose, many-bracted; bracts pectinate. July. *l.* cartilaginous on the margins, decurrent, winged, often white-spotted. Stem simple, glabrous. *h.* 3ft. South Enrope, 1630. Annual. (S. F. G. 824.)

**SCOLYTIDÆ**. An extensive group of small Beetles, often known as "Bark-beetles," because the larvæ of by far the greater number of species feed between the wood and the bark of trees, especially when the trees are dying. The insects, when mature, come out through holes in the bark. They are not, however, the only Beetles that feed in bark; but probably in no other family do so many species possess this habit. They are distinguished by their small size and cylindrical form



FIG. 455. SCOLYTUS GEOFFROYI, (a) natural size and (b) magnified.

(see Fig. 455), fitting them for their mode of life. They have four joints in each foot, the first joint being decidedly shorter than the next three together. The head is usually narrow, and occasionally it is lengthened into a beak, as in Weevils. The antennæ are clubbed. The colour is almost always some shade of dark grey or brown. The Beetles, after pairing, burrow through the bark, and form below it passages, which are usually straight or nearly so. The females lay eggs along the sides of the passages formed by each pair; and the larvæ, on hatching out from the eggs, burrow away from the main passages, taking the directions least likely to bring them into the burrows of one another. As they grow, they increase the width of their burrows to correspond with their own size, and when full-fed they become pupæ in the ends of the tubes; and from these they emerge as Beetles in the following spring. A considerable number of species have been found in Britain. Of these, some are confined to one kind of tree, while others feed in several different kinds. Most trees are liable to the attacks of several species of these Beetles; and *Coniferae*, especially Scotch Firs, are peculiarly infested by them. Each species makes tunnels so definite and characteristic in form that a practised entomologist can generally recognise, from the marks in the bark and the wood, the species of Beetle that has

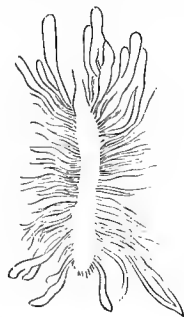


FIG. 456. MARKINGS ON INNER SURFACE OF ELM-BARK OF GAL-  
LIERIES FORMED BY SCOLYTUS GEOFFROYI (the wide gallery  
running up the middle is formed by the Female Beetle, the  
narrow side ones by the Larvæ).

made them (see Figs. 456 and 457). The family *Scolytidæ* has been split up into a number of genera, minor characters being employed for this purpose; but upon these it is unnecessary now to enter, since their habits, the

**Scolytidæ**—continued.

injuries done by them to trees, and the means of preventing or combating their attacks, are much alike in all the species. Fortunately, they seldom appear in quite healthy trees; but if trees have been weakened by any cause (e.g., unfavourable soil, or gases in the soil or in



FIG. 457. ELM TRUNK (much reduced), from which the Bark has been removed from one side to show the Galleries formed by *Scolytus Geoffroyi*.

the atmosphere), their destruction is often completed by these insects in a short time. Examples of this are frequently seen in the destruction by them of Elms and of other trees in public promenades in large towns (e.g., in Paris).

**Remedies.** The beetles prefer dying or dead wood in which to breed; hence, all such trees should be removed without delay, or, if the trunks are too large to be removed, the bark ought to be torn off and burned. It is well to leave some dead trunks as traps, since the



FIG. 458. OLD BARK OF ELM, showing Holes pierced by *Scolytus Geoffroyi*.

beetles resort to them in preference to living trees, and the logs can be burned with the insects in them. These traps should be renewed about every month during the breeding season, in summer. Where trees show holes (see Fig. 458), the bark should be removed from the infested

**Scolytidæ**—continued.

parts about the end of June. In a short time the larvæ will be dead, and most of them will have been removed by birds. Choice trees may be protected by saturating the outer bark with tobacco solution, or other applications distasteful to the beetles, about the breeding season. The more destructive species in Britain are as follows: On Elms, in avenues, &c., *Scolytus Geoffroyi* (also called *S. destructor* (see Figs. 455 to 458), *S. pygmaeus*, and *Hylesinus vittatus*; on Ash, *Hylesinus crenatus* and *H. Fraxini*; on Birch, *Scolytus Ratzeburgi* and (in the wood) *Bostrichus domesticus*; in Beech-wood, *B. domesticus*; on Scotch Firs and other Conifers, *Hylesinus polygraphus*, *Bostrichus chalcographus*, *B. typographus*, *B. Laricis*, *B. subrahis*, *B. bidentatus*, *B. micrographus*, *B. lineatus*, *B. cinereus*, *Hylesinus angustatus*, *H. palliatus*, *H. atra*, *H. piniperda*. *Scolytus Pruni*, on the Continent, occasionally proves hurtful to fruit-trees, e.g., Apple and Pear.

**SCOLYTUS.** A genus of **Scolytidæ** (which see).

**SCOOPS.** Tools employed for levelling or rendering smooth the bottoms of drains, when preparing for the drain-pipes. They are usually provided with long handles, and made in several widths, both hollowed and flattened in the sole part, intended for scooping out the soil. Some have the point of the Scoop turned on an angle towards the workman when in use; others turn in the opposite direction.

**SCOPARIA** (from *scopa*, a broom; the plants may be used for sweeping purposes). ORD. *Scrophularinææ*. A genus comprising five or six species of much branched herbs or small shrubs, natives of Mexico and South America, one being broadly dispersed over all warm regions. Flowers white, yellow, or pale bluish, rather small, on axillary or twin pedicels; calyx four or five-parted; corolla four-cleft. Leaves opposite or whorled, entire or toothed, dotted. Two species have been introduced—*S. dulcis* (Sweet Broom) and *S. flava*—both herbaceous; but they are probably lost to cultivation.

**SCOPOLIA** (named in honour of John Anthony Scopoli, 1732-1788, Professor of Natural History at Pavia, and author of botanical works). SYN. *Scopolium*. Including *Anisodus* and *Whitleya*. ORD. *Solanaceæ*. A small genus (three species) of hardy, erect, scarcely branched, perennial herbs; one is European, the second Japanese, and the third Himalayan. Flowers lurid-purple or greenish, veined, nodding; calyx truncate or broadly and shortly five-lobed; corolla ample, the limb five-angled or very shortly five-lobed; stamens five; pedicels solitary, filiform. Leaves membranous, entire. Two of the species have been introduced. They thrive in a light, dry soil, and in a shady situation. Propagation may be effected by division of the roots. *S. carniolica* is a very desirable plant, on account of its pretty flowers being produced in spring.

**S. carniolica** (Carniolan).\* fl. ½ in. long, solitary, axillary, nodding; corolla lurid-red, yellow or green within; peduncles ½ in. to 1¼ in. long. April. l. entire, petiolate, ½ in. to ¾ in. long, ovate or obovate-oblong, sub-cuspidate; petioles ½ in. long. h. 1 ft. or more. Russia, &c., 1780. (B. M. 1126, under name of *Hyoscyamus Scopolia*.)

**S. lurida** (lurid). fl. axillary; corolla at first green, then yellowish, at length purplish; peduncles ½ in. to 2 in. long. September. l. petiolate, ovate, acute, undulate, wrinkled, the larger ones 6 in. to 7 in. long, mostly unequal, glabrous above, slenderly-tomentose and canescent beneath. h. 4 ft. to 6 ft. Nepal, 1824. (S. B. F. G. 125, under name of *Whitleya stramonifolia*.)

**SCOPOLIA** (of Smith). Included under **Toddalia** (which see).

**SCOPOLINA.** A synonym of **Scopolia** (which see).

**SCORDIUM.** Included under **Teucrium** (which see).

**SCORIAS.** A synonym of *Carya*.

**SCORODONIA.** Included under *Teucrium* (which see).

**SCORPIOID.** "A form of unilateral inflorescence which is circinate coiled in the bud; in the stricter sense, a form with the flowers two-ranked, these being thrown alternately to the right and left" (Asa Gray).

**SCORPION GRASS.** A common name for *Myosotis*.

**SCORPIURUS** (from *scorpius*, a scorpion, and *oura*, a tail; alluding to the twisted form of the legumes). Caterpillar Plant. ORD. *Leguminosæ*. A genus comprising about half-a-dozen species of hardy, nearly stemless or decumbent herbs, natives of South Europe, North Africa as far as the Canary Isles, and Western Asia. Flowers yellow, often small, solitary or umbellate on axillary peduncles, nodding. Pods sub-terete, tubercled or muricated, circinate-involute. Leaves simple, entire, continuous with the petioles. The species are not very beautiful, and are rarely cultivated in this country. *S. vermiculata* is a trailing annual. Seeds should be sown in the open border, during spring, and the young plants treated as other hardy annuals.



FIG. 459. FRUITING BRANCHLET AND DETACHED POD OF *SCORPIURUS VERMICULATA*.

**S. vermiculata** (worm-shaped-podded). *fl.* solitary on the peduncles; standard streaked with red. June and July. Pods thick, glabrous, with the inner ribs almost obsolete, but the ten outer ones bear crowded stipitate tubercles, which are obtusely dilated at apex. *l.* tapering into the petioles. 1621. See Fig. 459.

**SCORZONERA** (from old French *scorzon*, Catalanian *scurzon*, a serpent; in allusion to the cooling, anti-febrile effects of *S. hispanica*, which was formerly employed in Spain, on account of these properties, for the cure of serpent bites). Viper's Grass. Including *Podospermum*. ORD. *Compositæ*. A large genus of hardy, glabrous, floccose-woolly, or hairy, perennial or rarely biennial or annual herbs. About 120 species have been described; but probably the number entitled to that rank is less than 100; they inhabit Europe, North Africa, and Central and Western Asia. Flower-heads yellow or purple, often rather large, on long peduncles; involucre cylindrical or campanulate, with imbricated, acute or acuminate bracts in many series; receptacle naked or

**Scorzonera**—continued.

foveolate; florets ligulate, truncate five-toothed at apex; achenes linear, sub-terete, or the outer ones angular, glabrous or villous. Leaves alternate, sometimes entire and grass-like or broader, sometimes more or less pinnately lobed or dissected. *S. hispanica* is cultivated in gardens for the use of its long, tapering roots, which are cooked in a similar way to those of Salsify. Their outside skin is black; but the inside flesh is white. Seeds should be sown at the end of March, or any time during April, in drills 1ft. apart, and the plants, when large enough, thinned to 6in. or 8in. asunder. An open situation is preferable, and deep soil, which should not be newly manured for the crop. The roots will be ready for use in November, and on through the winter. Some should be lifted before frost sets in, and stored in sand, in a cool shed, to be ready for use whenever required. All the other species may be grown from seeds, sown in the open border, in spring, and the seedlings afterwards thinned out. The perennials may be increased by division of rootstocks, either in autumn or just when growth begins in spring.

The species best known to cultivation are described below; except where otherwise stated, they are perennials.

**S. coronopifolia** (Buckhorn-leaved). *fl.*-heads yellow, one to a stem; involucre scales mucronate, the outer ones ovate. June and July. *l.* lanceolate, mostly pinnatifid; lobes linear, unequal. Stems erect, nearly simple, leafy at base. *h.* 1ft. North Africa, 1818.

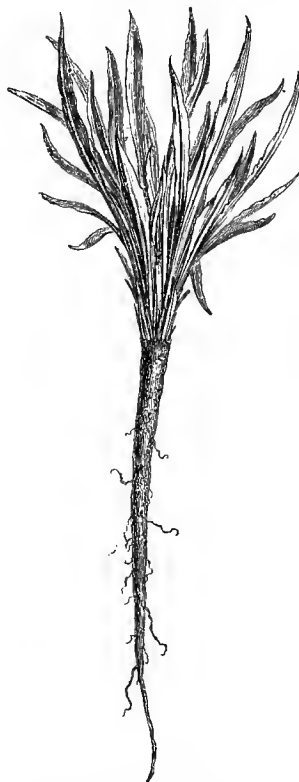


FIG. 460. *SCORZONERA HISPANICA*.

**S. hispanica** (Spanish).\* Common Viper's Grass. *fl.*-heads yellow; involucre oblong, the scales slightly glabrous, acuminate. June to September. *l.* amplexicaul, lanceolate, undulated or slightly toothed, glabrous or somewhat pubescent. Stem branched; branches naked, one-headed at apex. Root nearly the shape of a carrot, but smaller and dark-coloured,

**Scorzonera**—continued.

pure white internally, of a sweet and agreeable flavour. *h.* 3ft. South Europe, &c., 1576. See Fig. 460.

**S. laciniata** (torn). *fl.*-heads yellow; involucre scales slightly hooked at the apex. June and July. *l.* pinnatisect; lobes linear, entire. Stems sub-erect, naked and one-headed at the apex. *h.* 2ft. South Europe, 1640. Biennial.

**S. mollis** (soft). *fl.*-heads yellow, the rays purplish beneath; involucre, as well as the elongated, sub-corymbose peduncles, woolly-villous. June and July. *l.* linear-subulate, keeled, woolly-villous; old ones nearly glabrous; young ones undulately crisped on the margins. *h.* 1½ft. Caucasus, 1818. (*B. M.* 3027.)

**S. purpurea** (purple). *fl.*-heads purplish; involucre cylindrical, the scales broadly lanceolate, not ciliated; achenes smooth. May and June. *l.* linear-subulate, channelled, triquetrous. Stems branched, two to five-headed. Root cylindrical-fusiform. *h.* 2ft. Eastern Europe, &c., 1759. (*J. F. A.* 35.)

**S. p. grandiflora** (large-flowered). A more showy and much stouter plant than the type, with larger flowers. (*B. M.* 2294.)

**S. p. rosea** (rosy). *fl.*-heads rose-pink; involucre scales lanceolate, acuminate; achenes sulcate, muciculated above. July. *l.*, radical ones elongated, linear-lanceolate, flat, glabrous; cauline ones few, carinate-linear. Stems simple, one-headed. *h.* 1½ft. Eastern Europe, &c., 1807.

**S. undulata** (undulated).\* *fl.*-heads purplish-rose, 2in. to 2½in. in diameter; involucre cylindric, white-downy; peduncles slender, green or purplish. July. *l.*, radical ones nearly 1ft. long, narrowly linear-lanceolate, entire, rather long-petiolate, with a yellow midrib; cauline ones 3in. to 6in. long, gradually narrowed from a broad, sessile base to a very fine point. Stem 1ft. to 2ft. high, slender, branched. Algeria and Morocco, 1874. (*B. M.* 6127.)

**SCOTCH BONNETS.** A common name for *Marasmius oreades*.

**SCOTCH PINE.** See *Pinus sylvestris*.

**SCOTCH PRIMROSE.** A common name for *Primula scotica*.

**SCOTTEA** (named in honour of R. Scott, M.D., Professor of Botany in Dublin). *ORD.* Leguminosæ. A monotypic genus, now included by Bentham, under *Boissæa*. The species and its varieties are elegant, greenhouse, evergreen shrubs, thriving in sandy peat. Propagated freely by cuttings of the young wood, inserted in sand, under a glass.

**S. dentata** (toothed). *fl.* orange-red or yellow, more or less tinged with green, on solitary pedicels; calyx ½in. to ¾in. long, with short, obtuse teeth; standard ¾in. to 1in. long; keel and wings over ¾in. long; bracts broad and rigid, but very deciduous. Summer. *l.* opposite, varying from broadly ovate-cordate or triangular to hastate-lanceolate or almost linear, ¾in. to 1in. long, acute or obtuse, irregularly denticulate. *h.* 3ft. to 7ft. Australia, 1803. (*L. B. C.* 1458.)

**S. d. angustifolia** (narrow-leaved). *l.* hastate-lanceolate to almost linear; margins revolute. 1825. (*B. R.* 1266, under name of *S. angustifolia*.)

**S. d. hastata** (halberd-shaped). *l.* ovate-hastate or hastate-lanceolate, ¾in. to above 1in. long, ¾in. to 1in. broad. 1833. (*B.* 134 and *B. R.* 1233, under name of *S. dentata*; *B. R.* 1652, under name of *S. laevis*.)

**SCRAPERS.** Scrapers of some description should be placed in various positions in gardens, particularly at points where there are paths cut in the ordinary soil joining others with a gravel surface. It matters little what sort is used if they are securely fixed into blocks of wood to keep them firm.

**SCREENS.** A shrubbery or belt of fast-growing trees is termed a Screen, when planted for affording shelter to a garden, an orchard, or any separate part of a garden requiring protection from an unfavourable quarter. Gardens on the sea-coast invariably need a shelter or Screen from the wind and salt spray; this is generally provided by planting a belt of trees or shrubs that are known to succeed in such situations. The term also denotes anything erected or grown to hide an unsightly object from any particular point, such as from one of the principal walks in a garden. This may be done effectually, if only to a moderate height, by lattice-work, with Ivy or other creepers trained upon it, and more extensively by free-growing trees and evergreen shrubs. There are numerous methods of forming Screens;

**Screens**—continued.

some are of general application, but there are many instances where special preparations have to be made to meet peculiar local requirements.

**SCREW PINE.** See *Pandanus*.

**SCREW-TREE.** A common name for *Helicteres*.

**SCROBICULATE.** Marked by tiny depressions.

**SCROFULA-LEAF, or SCROFULA-WEED.**

A name applied to *Goodyera pubescens*.

**SCROPHULARIA** (so named in reference to its former supposed benefit in cases of scrofula, owing to the resemblance of the roots of some species to scrofulous tumours). *Figwort. ORD. Scrophularineæ.* A genus comprising about 120 species (which number may, according to Bentham and Hooker, be reduced to 100) of mostly hardy, often fetid, annual, biennial, or perennial herbs or sub-shrubs, broadly dispersed over the extra-tropical regions of the Northern hemisphere. Flowers greenish-purple, lurid-purple, or yellow, generally rather small, in panicle, thyrsoid cymes; calyx deeply five-cleft or five-parted; corolla tube ventricose, globose or oblong; lobes five, short and flat, the four upper ones erect, the lowest spreading; perfect stamens four, the fifth usually rudimentary. Leaves opposite, or the upper ones alternate entire, cut, or dissected, often pellucid-dotted. *S. aquatica* (Brook or Water Betony, &c.), *S. nodosa* (Murray Grass, &c.), and *S. Scordonia*, are natives of Britain, while *S. vernalis* has become naturalised. Few of the species have any horticultural value. Only one calls for mention here. It thrives in ordinary garden soil, as a pot plant, in a cool frame, and may be multiplied by seeds.

**S. chrysantha** (golden-flowered).\* *fl.* ½in. long, drooping; corolla golden-yellow, ovoid, turgid, contracted at the mouth; cymes densely packed in the upper leaf axils, forming a rounded head 2in. in diameter. March. *l.* 2in. to 3in. broad, ovate- or orbicular-cordate, lobulate and toothed, convex, wrinkled. *h.* 6in. to 18in. Caucasus, &c., 1882. A stout, erect biennial. (*B. M.* 6629.)

**SCROPHULARINEÆ.** A natural order of herbs, sub-shrubs, shrubs, or small trees, found in all climates, but mostly in temperate regions. Flowers hermaphrodite, often irregular; calyx inferior, persistent, with five, rarely four, teeth or lobes; corolla gamopetalous; limb of five or four, very rarely six or eight, equally spreading lobes, or more or less bilabiate, with the upper lip entire, emarginate, or bilobed, and the lower one trilobed and often spreading; stamens often four, didynamous, or two, alternating with the corolla lobes; anthers two-celled, sometimes one-celled by the confluence of the sutures across the top of the connective; inflorescence variable. Capsules variable, dehiscent, or rarely baccate and indehiscent. Leaves, in a few genera, all alternate, in most cases the lower ones (or all) opposite or whorled, the upper and floral ones often alternate, entire, toothed, or rarely variously lobed or dissected; stipules none. Many of the species are of medicinal value: chief among these is the Foxglove. The order is a most important one from a horticultural standpoint, contributing, as it does, so many beautiful plants to our gardens. It embraces, according to Bentham and Hooker, 157 genera and nearly 1900 species, and is divided by those authors into twelve tribes: *Antirrhineæ*, *Aptosimeæ*, *Calceolareæ*, *Cheloneæ*, *Digitaleæ*, *Euphrasieæ*, *Gerardieæ*, *Gratiroleæ*, *Hemimerideæ*, *Leucophylleæ*, *Manuleieæ*, and *Verbasceæ*. Among the many well-known genera, the following may be cited as examples: *Antirrhinum*, *Calceolaria*, *Chelone*, *Digitalis*, *Mimulus*, *Pentstemon*, and *Verbascum*.

**SCROTIFORM.** Pouch-like.

**SCRUBBY OAK.** See *Lophira africana*.

**SCRUB OAK.** See *Quercus Catesbæi*.

**SCURF.** A condition often met with in Potato tubers, in which the surface shows clefts or slits, beneath which lie black masses of rotting tissue. Observation of the cause shows this to be, in part at least, the presence of superfluous moisture in the soil. This favours greatly the production of what are known as lenticels, or small groups of loosely-arranged cells below the stomata. These loose cells increase, and readily absorb water from the exterior. The swelling bursts the outer skin of the tuber, forming the slits, and giving still more free access to water. Cork is formed to repair the injury; but is also burst by increased growth of the lenticel, and is renewed to repair the injury as far as possible. The cells saturated with moisture begin to decay, and offer a favourable occasion of entrance to the spores of Fungi; hence, in a short time, the tissues below the slits become blackened and soft, the cells show Fungus threads, and the starch is removed from the neighbouring cells. Even where the actual amount of material destroyed is small, the unsightly appearance of the tubers frequently lessens the value of the crop. The best remedy is good drainage, together with efficient means to loosen the soil, and to permit free access of air.

The term "Scurf" is also applied to the loose, scaly matter on the epidermis.

**SCURFY PEA.** See *Psoralea*.

**SCURVY GRASS.** See *Cochlearia officinalis*.

**SCUTATE, SCUTIFORM.** Having the form of a small, round bud.

**SCUTELLARIA** (from *scutella*, a dish or platter; alluding to the form of the fruiting calyx). Helmet Flower; Skull-cap. SYN. *Cassida*. ORD. *Labiatae*. A genus comprising about ninety species of stove, greenhouse, or hardy, annual or perennial herbs or sub-shrubs, decumbent or diffuse, rarely erect and tall, very rarely shrubs; they are scattered over temperate regions and the tropical mountains. Flowers blue, violet, yellow, or white, solitary or in pairs, axillary or in terminal spikes or racemes; calyx campanulate, two-lipped, the tube dilated opposite the posterior lip into a broad, flattened, hollow pouch, both lip and pouch deciduous in fruit, the anterior lip closed after flowering, persistent; corolla tube long, naked inside; limb bilabiate, the upper lip entire or notched, the lower dilated, its lateral lobes free and spreading, usually connate with the upper lip, rarely with the lower; stamens four. Nutlets sub-globose or depressed. Leaves often toothed, sometimes pinnatifid or entire; floral ones conformed or changed into bracts. *S. galericulata* and *S. minor* are the British representatives of the genus. The species described below are, for the most part, very handsome when in flower, and hence are well suited for ornamenting the front of flower borders. Any common garden soil is usually suitable. The herbaceous species may be increased by seeds, or by divisions; and the shrubby kinds may be readily multiplied by cuttings. *S. Mociniana* is one of the most beautiful of stove, flowering plants, and may be easily grown by anyone with a cool stove or warm greenhouse temperature. The bunches of flowers are freely produced—one on the point of almost every shoot—and are very bright and effective. Cuttings of half-ripened shoots root readily in spring, or at almost any season, in a warm propagating-frame. Young plants should have their points pinched out once or twice when growing, to encourage a bushy habit, and so insure a much larger production of flowers. Nice little specimens may be grown in 5in. pots. They succeed best in loam and leaf soil or decayed manure, with some sand intermixed. Except where otherwise indicated, the species here given are hardy, herbaceous perennials.

**S. albo-rosea** (white-and-rose). *fl.* borne in long, terminal racemes; corolla lilac, becoming paler towards the base of the long tube. Summer. *l.* ovate-oblong, cordate at base, undulated.

### Scutellaria—continued.

Stem tetragonal. *h.* 1½ft. Woods of the upper Amazons, 1859. Stove shrub. (I. H. 584.)

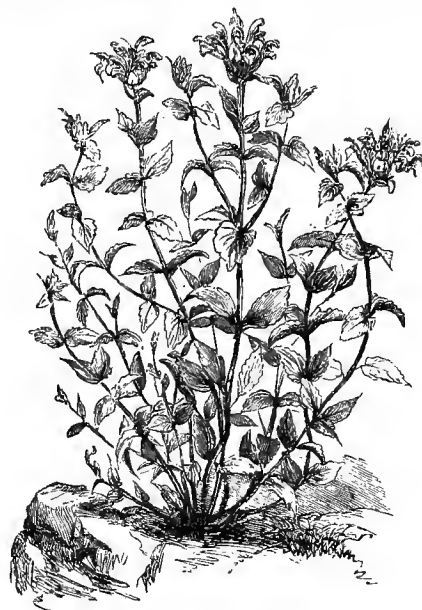


FIG. 461. SCUTELLARIA ALPINA.

**S. alpina** (alpine).\* *fl.* in oblong, tetragonal spikes; corolla wholly purple or with the tube or lower lip yellow, 1in. to 1½in. long. August. *l.* sub-sessile or shortly petiolate, ovate, slightly acute, rounded or cordate at base, loosely-crenate, serrate, six to ten lines long, pubescent or pilose; floral ones coloured, imbricated. Stems procumbent, often rooting at base. Europe and Central Asia, 1752. See Fig. 461. (A. F. P. 26, fig. 3; B. R. 1460; S. B. F. G. 90.) The variety *tupulina* has entirely yellow flowers. (B. R. 1493, under name of *S. tupulina*.)

**S. aurata** (golden-flowered). *fl.* numerous, erect, in a terminal raceme; corolla yellow, very long, tubular-infundibuliform; pedicels short; bracts linear, reflexed. Summer. *l.* on rather long petioles, ovate, obtuse, acuminate, auriculate-cordate at base, the lobes approximate, entire, or obsoletely and remotely denticulate. Stem tetragonal. *h.* 1ft. to 1½ft. Brazil, 1863. Stove perennial. (I. H. 1862, 368.)

**S. a. sulphurea** (sulphur-coloured). *fl.* of a pale sulphur-colour, smaller than in the type. (B. M. 5525.)

**S. Columnæ** (Columna's). *fl.* opposite, secund; corolla dark purple, ten to twelve lines long, loosely pubescent outside, the throat dilated; pedicels as long as the fruiting calyx; racemes 6in. or more long, loose, slightly branched, pilose. July. *l.* petiolate, ovate, 2in. long, crenate, broadly cordate or truncate at base, scarcely wrinkled, slenderly pubescent; floral ones ovate. Stem erect, 2ft. to 3ft. high, branched, pubescent. South Europe, 1806. (S. B. F. G. 52.)

**S. oostaricana** (Costa Rica).\* *fl.* numerous, racemose, sub-seund; calyx (and pedicel) dark purple, small; corolla of a rich golden-scarlet, the inside of the lips a deep yellow, 2½in. long, erect, tubular-infundibuliform. June. *l.* ovate, acuminate, serrate-dentate; petioles rather long. Stem dark purple, erect. *h.* 1½ft. to 3ft. Costa Rica, 1863. A beautiful stove perennial. (B. M. 5439.)

**S. galericulata** (skull-cap). *fl.* secund, pubescent, solitary; corolla blue, variegated with white inside, 3in. long, the tube curved; bracts leaf-like; pedicels very short. July to September. *l.* shortly petiolate, 4in. to 2½in. long, oblong or ovate, cordate at base, obtuse or sub-acute, rather remotely crenate-serrate. Stems 6in. to 18in. long, slender, simple or branched. Europe (Britain), &c. (Sy. En. B. 1060.)

**S. grandiflora** (large-flowered). *fl.* in tetragonal, oblong spikes, which are eventually 1½in. long; corolla purplish, smaller than in *S. orientalis*. July. *l.* long-petiolate, somewhat roundish-ovate, incised-toothed, softly tomentose beneath or on both sides; floral ones entire, imbricated, pubescent. Stems procumbent. Altaian Alps, Siberia, 1804. (B. M. 635.) SYN. *S. pulchella*.

**S. Hartwegi** (Hartweg's).\* *fl.* scattered, in loose, simple racemes; corolla bright red, 1in. long, with a violet lower lip. Summer. *l.* ovate, slightly acuminate, unequally crenate-serrate, roundly

**Scutellaria**—*continued*.

truncate or loosely cordate at base, green above, purple, and puberulous on the veins, beneath; petioles puberulous. *h.* 1ft. to 2ft. Quito, 1882. A very ornamental, stove sub-shrub. (B. M. 6615.)

**S. incarnata** (flesh-coloured). *fl.* in terminal, second spikes; calyx tubular, compressed; corolla flesh-coloured or pale reddish-violet, pubescent, six times longer than the calyx, with a spreading limb. Summer. *l.* petiolate, ovate, deeply serrated, 1in. to 3in. long, intense green, pubescent above, tomentose beneath; floral ones linear-lanceolate, equalling the pedicels. Stem erect, 2ft. high, pubescent. Central America, 1856. Stove perennial. (B. M. 4268.)

**S. l. Triana** (Triana's). This variety chiefly differs from the type in the much richer rose-scarlet of its corolla, and in the smaller, glabrous foliage. (B. M. 5185.)

**S. japonica** (Japanese). *fl.* opposite, loose; calyx slightly pilose; corolla blue, six to eight lines long, pubescent; racemes loose-flowered, 6in. long. Summer. *l.* petiolate, ovate, obtuse, deeply crenate, rounded or truncate at base, glabrous; lower ones 1½in. long; floral ones gradually becoming smaller. Stems prostrate at base; branches ascending. Japan. (P. M. B. x. 123.)

**S. Lehmanni** (Lehmann's). *fl.* bright red-scarlet, disposed in short, terminal racemes. Summer. *l.* cordate, petiolate. Stems erect. *h.* 1ft. to 2ft. Columbia, 1884. An ornamental stove perennial. (R. G. 1152, fig. 1, a-c.)

**S. macrantha** (large-flowered). *fl.* opposite, second; calyx pilose; corolla blue, 1in. long, the tube much dilated upwards, the hood incurved; racemes many, simple. August. *l.* sessile, lanceolate, obtuse, entire, nearly glabrous, ciliated; floral ones longer than the calyx. Stem procumbent at base, ascending, often purplish, nearly glabrous. Eastern Asia, 1827. (B. M. 4420.)

**S. minor** (lesser). Hedge Hyssop. *fl.* pale pink-purple, ½in. long. July to October. *l.* shortly petiolate or sessile, ½in. to 1in. long, obtuse, with one or two crenatures near the base; upper ones quite entire, *h.* 4in. to 6in. Europe (Britain), &c. Habit resembling *S. galericulata*, but smaller. (Sy. En. B. 1061.)

**S. Mociniana** (Mocini's).\* *fl.* opposite, second; calyx one-sixth the length of the corolla; corolla showy, bright scarlet, 1½in. to 1½in. long, with the inside of the lip yellow and the tube clothed with short, fine hairs, the limb erect. Summer. *l.* petiolate, ovate, sub-sinuate-crenate, slightly hispid above, nearly glabrous beneath; lower floral ones conformed, the upper ones small, oblong. *h.* 1½ft. Mexico, 1868. A very beautiful stove shrub. (Gn., Sept. 1, 1877; I. H. 562; R. H. 1872, 350.)

**S. orientalis** (Oriental).\* *fl.* in oblong, tetragonal spikes; corolla yellow, or with the lower lip fuscous or purplish, 1in. to 1½in. long. August. *l.* petiolate, ovate, incised-toothed, four to ten lines long, hoary beneath; floral ones entire, membranous, slightly imbricated. Stems creeping, and often rooting from the base, ascending, slenderly cano-tomentose. South Europe and Central Asia, 1729. (B. M. 2120; S. B. F. G. 45.)

**S. parvula** (rather small). *fl.*, calyx as long as the pedicels; corolla violet, pubescent, twice or thrice the length of the calyx. Summer. *l.* ovate, or the uppermost ones ovate-lanceolate, sessile by a truncate or slightly cordate base, about ½in. long, some of the lower ones with one or two coarse teeth, the lowest slender-petiolate. Roots tuberous. *h.* 4in. to 10in. North America, 1822. Plant branching from the base, usually erect. (H. E. F. 106.)

**S. pulchella** (pretty). A synonym of *S. grandiflora*.

**S. purpurascens** (purplish). *fl.* in terminal, loose racemes; corolla ½in. long, the tube and upper lip bright blue, the lower lip dark violet with a median white stripe. Summer. *l.* on long petioles, broadly ovate, obtuse, sinuate-crenate, very broadly truncate, rounded, or sub-cordate at base, slightly hispid above, or glabrous on both sides. *h.* 1ft. to 2ft. South America, 1880. A useful, decorative, greenhouse perennial. (B. M. 6464.)

**S. serrata** (serrated). *fl.*, corolla blue, fully 1in. long, nearly glabrous, with a narrow tube, a moderately ampliate throat, and a rather narrow upper lip; raceme simple or rarely a pair of racemes at the base of the terminal one. August. *l.* three to five pairs, ovate or ovate-oblong, coarsely and sharply serrated, acute or acuminate, mostly acute at the base, 2in. to 4in. long; upper floral ones entire and lanceolate. Stem 1ft. to 2ft. high. North America, 1800. (A. B. R. 494.)

**S. splendens** (splendid).\* *fl.* scattered; corolla scarlet; ten to eleven lines long, the tube elongated, slender, the lobes shortened; racemes simple, elongated. October. *l.* petiolate, broadly ovate, obtuse or scarcely acuminate, 4in. to 5in. long, deeply cordate at base, hairy on both sides; floral ones minute. Stems ascending, branched, hairy or pubescent. *h.* 1ft. Mexico, 1841. Stove perennial. (B. M. 4290, under name of *S. cordifolia*.)

**S. Ventenatii** (Ventenat's). *fl.*, calyx small; corolla scarlet, elongated, many times longer than the calyx, the upper lip deeply four-cleft; bracts very deciduous, narrow, the lower ones sub-ovate; racemes terminal, elongated, sub-second or sub-distichous. August. *l.* long-petiolate, rather thick, cordate-ovate, somewhat obtuse, deeply serrated. *h.* 1½ft. Santa-Martha, 1844. An erect, branched, softly pubescent, greenhouse perennial. (B. M. 4271.)

**Scutellaria**—*continued*.

**S. villosa** (villous). *fl.* glandular-villous; corolla scarlet, the tube elongated, slenderly funnel-shaped, the lobes shortened; bracts small; racemes terminal, many-flowered, short, corymbose. July. *l.* petiolate, cordate-ovate, soft, acuminate, deeply sinuate-toothed, wrinkled, pilose, purple beneath. Stems acutely tetragonal, branched. *h.* 1½ft. Peru, 1842. Stove shrub. (B. M. 4789; F. d. S. 961.)

**SCUTELLIFORM**. Platter-shaped.

**SCUTICARIA** (from *scutica*, a whip; alluding to the shape of the leaves). ORD. *Orchidæ*. A small genus (two species) of stove, epiphytal orchids, one Brazilian, the other a native of Guiana. Flowers very handsome; sepals sub-equal, erecto-patent, the lateral ones adnate with the foot of the column forming a prominent chin; petals rather smaller; lip sessile, articulated, broad and concave, the lateral lobes large, erect, the middle one small and spreading; pollen masses four; scapes one-flowered, growing from the sides of the stem. Leaves very long, fleshy, sub-terete, furrowed, continuous with the stem. Stems very short, fleshy, one-leaved, at length scarcely fleshy-thickened. The species thrive either on blocks or in baskets with sphagnum. During the growing season an abundance of water must be supplied to the roots. Propagation may be effected by divisions, made as growth is commencing.

**S. Hadwenii** (Hadwen's). This is the correct name of the plant described in this work under name of *Bifrenaria Hadwenii*.

**S. Steelii** (Steel's).\* *fl.* primrose-yellow, with reddish-brown blotches, large, fragrant; lip marked with brownish-crimson, especially on the lateral lobes, the crest having three orange-coloured teeth in front; scape one to three-flowered. *l.* one on each branch of the bulbous rhizome, terete, 2ft. to 4ft. long, channelled, tapering to a fine point. British Guiana, 1834. SYN. *Maxillaria Steelii* (B. M. 3573; B. R. 1936; W. O. A. ii. 55.)

**SCUTULA**. A synonym of **Memecylon** (which see).

**SCYPHANTHUS**. A synonym of **Grammatocarpus** (which see).

**SCYPHULARIA**. Included under **Davallia** (which see).

**SCYTALIA**. Included under *Nephelium*.

**SCYTALIS**. A synonym of **Vigna** (which see).

**SCYTANTHUS** (of Hooker). A synonym of **Hoodia** (which see).

**SCYTHES**. Since the introduction of mowing machines, these have not been so extensively used in gardens. The ordinary form of handle and blade answers well for mowing grass where no machine is kept, and also for cutting it where a machine cannot conveniently be worked. A Scythe for lawn-mowing should be "hung" differently from those used amongst long field-grass. The stick and handles should be attached so that the edge of the blade may be slightly raised above ground when the back is resting on the ground. The workman should be careful to avoid, so far as possible, what is called "ribbing"—that is, mowing so as to show the marks of the Scythe after the grass has been swept up and taken away. This is scarcely possible unless the blade has been properly attached to the handle for the special purpose of cutting short lawn-grass.

**SEA BEET**. A common name for *Beta maritima*.

**SEA BELLS**. A common name for *Calystegia Soldanella*.

**SEA BUCKTHORN**. See **Hippophaë**.

**SEAFORTHIA**. A synonym of **Ptychosperma** (which see). The plant so well known in gardens as *S. elegans* is *Ptychosperma Cunninghamiana*. *S. coronata*, *S. Kuhlii*, and *S. malaiana*, are garden names of *Pinanga coronata*, *P. Kuhlii*, and *P. malaiana* respectively.

**SEA HEATH**. See **Frankenia**.



**SEA HOLLY.** A popular name for *Eryngium maritimum* and other species.

**SEA KALE** (*Crambe maritima*). A hardy, herbaceous perennial, a native of Britain. It is very extensively cultivated in gardens as a vegetable for forcing, and for use in spring when the season's growth commences. The young shoots and leaf-stalks are the parts cooked when they are crisp and well blanched. The stronger these can be obtained, the better; the chief object is, therefore, to cultivate with a view to securing good, large roots and crowns previous to forcing them. Sea Kale may easily be raised from seed, which should be sown in an open situation at the end of March, or early in April, according to the state of the soil. Sow in drills 12in. apart, and thin the young plants to about 6in. asunder in the rows for the first year. Before the next spring, the roots must be lifted, and replanted in rows from 2ft to 2½ft. apart, for growing into a size large enough for use. All the crowns and huds at the top must be cut off before replanting, and the roots inserted so that their tops are 1in., or even 2in., below the surface. Sometimes, Sea Kale is sown at wider distances than those above given, and the plants allowed to grow for two years without being transplanted, when the tops may be blanched and used; but when thus treated the tops of the crowns must be cut off, to prevent the plants seeding the second year. The greater part of the Sea Kale plants grown specially for forcing are raised from cuttings made from the roots. When a quantity of fully-developed

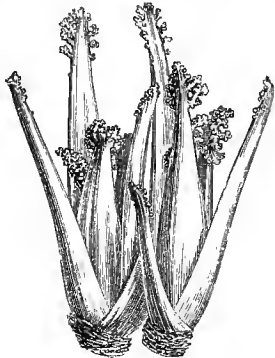


FIG. 462. SEA KALE.

crowns are lifted for forcing, there are plenty of pieces to be detached from the main root; these are sometimes called thongs, and any about 4in. in length will do for planting. They should be cleanly cut through with a knife, the upper end straight, and the lower or smaller end on an angle, in order that each may be readily distinguished at planting time, which will be in the following March, or early in April. Meanwhile, during winter, these prepared root-cuttings must be buried in a heap of sandy soil. All the larger roots that have been forced may also be cut over and replanted, but it is advisable to keep growing some young ones each year. The roots covered with soil will have been forming shoots by early spring all round the crowns; they should be planted about 1ft. apart, in trenches, which require to be 2ft. asunder, to allow the leaves to develop. The crown portion of the cutting must be placed so as to be covered with soil. The numerous shoots which appear may, in due course, be reduced to one, the strongest; this will then grow rapidly, if the soil is rich and of good depth. After the leaves die away in autumn, the roots, if intended for forcing under glass, may be lifted, covered temporarily with soil, and protected until required for introducing into heat. During this process, any pieces of roots large enough for cuttings may be collected and treated for another year in the way

**Sea Kale—continued.**

above described. Root cuttings taken from plants that have not been forced are much stronger and superior to those saved from forced and, consequently, weakened stocks.

**Forcing.** Sea Kale is one of the easiest of plants to force, provided heat is very gradually applied: it will not withstand a high temperature at first. An easy method, where a supply of crowns has been prepared, is to place several nearly close together in large pots, and stand them in a temperature of about 45deg., turning an empty pot over the top, to exclude light. The floor of a mushroom-house is generally a good place, and, as this structure is usually kept dark, the shoots become blanched as they grow without being covered. They should be cut for use when at the stage represented in Fig. 462, and detached at the crown as shown. Sea Kale may also be forced in the ground by inverting over it large pots specially made for the purpose, and covering with fermenting material. A gradual heat is necessary, a very little at first is sufficient to excite growth. Light must always be excluded during the forcing process, in order to insure thorough blanching.

**SEA LAVENDER.** A popular name for various species of *Stotice*.

**SEAL-FLOWER.** A common name for *Dicentra spectabilis*.

**SEA MILKWORT.** See *Glaux*.

**SEA PINK.** See *Armeria*.

**SEA ROCKET.** See *Cakile*.

**SEASIDE GRAPE.** See *Coccoloba*.

**SEASIDE GROUNDS AND PLANTS.** The Seaside, as generally understood, is the coast-land immediately adjoining the sea, and, consequently, exposed to the influences of strong sea-breezes, and, with these, plenty of salt spray. Both have their evil effect on trees, and, with some exceptions, on plant-life generally; but as Seaside residences are so numerous, and most of them have some sort of a garden attached, it may be of service to note some of the trees and plants best suited for protecting and rendering them attractive. On exposed parts of the sea-coast it is invariably necessary to plant, so far as may be practicable, a screen or broad belt of trees and shrubs that are sure to be capable of withstanding the exposure, and eventually affording protection for more tender subjects. Hurdles have to be placed round plants during winter, and numerous other contrivances resorted to for affording protection. Plants which, perhaps, thrive well just out of the reach of the salt spray may, and often will, succumb when exposed to it; and the wind may blow on certain points with great violence, while a short distance off it may seldom be seriously felt. The arrangement of Seaside Grounds should, therefore, be in the hands of someone with a knowledge of the locality, and of the amount of exposure that preparation has to be made for contending against. A screen of trees and shrubs is usually much better than a wall for a protection; the wind passes over the latter with destructive violence, while its force becomes, as it were, lost on a mass of foliage. It is, however, often as much of a difficulty to get screen-plants established as it is those which are intended to be screened because of being tender or more ornamental. Only small or moderate-sized specimens should be inserted, even for forming screens, or they will be rocked about by the wind before the roots can get a hold, and, consequently, will not answer permanently.

Some of the trees and shrubs most likely to succeed in very exposed situations on the sea-coast are: *Euonymus japonicus*, *Tamarix gallica* (a most valuable and exceedingly hardy plant for forming screens), *Escallonia*



**Seaside Grounds and Plants—continued.**

*macrantha*, Phillyreas, Berberries, Cotoneasters, thick-leaved Rhododendrons, Evergreen Oak (*Quercus Ilex*), Elders, the Sea Buckthorn (*Hippophae rhamnoides*), Gorse (*Ulex Europæus*), Ivies, thick-leaved Hollies, Willows, common Junipers, *Rosa spinosissima*, *R. rubiginosa* (Sweet-briar), *R. rugosa*, &c. Amongst Pines, the hardiest are *P. austriaca*, *P. Laricio*, and *P. Pinaster*.

**SEASIDE POPPY.** A common name for *Glaucium flavum*

**SEA STARWORT.** A common name for *Aster Tripolium*.

**SEA THRIFT.** See *Statice Limonium*.

**SEATS.** As resting-places in the pleasure-grounds, park, and woods of a gentleman's domain, Seats are always necessary adjuncts; for the croquet-ground, cricket-ground, &c., they are indispensable. In the gardens of the suburban villa, and of the cottage, they are alike in request. Seats may be of classic design, the work of the sculptor and architect, upon the nobleman's terrace; logs of wood, placed informally at the base of some large tree, in the park; a simple rustic plank, with a more or less grotesque back rail formed of crooked branches, for the shrubbery and the woods. But, as a rule the above are not admissible into dressed grounds. The inventive faculties of manufacturers of garden furniture have of late years placed within the reach of all classes a variety of Seats much more enjoyable and convenient than the uncomfortable rustic Seats of former times.

Most of the large furnishing ironmongers, in the principal towns, supply Seats suitable for the margins of walks, croquet-grounds, and other places (where a considerable number of persons require accommodation), that will each afford rest to from six to eight persons; some of these have a back to shut down over the Seat to keep it dry—the “Windsor,” the “Osborne,” and the “Sandringham,” are good examples—others are fitted with awnings, and very ingenious mechanism for opening and closing the same at pleasure. In some, the “awning” forms a screen at the back: by this contrivance persons using the Seat are secured from the chill east winds that prevail in spring and early summer, and which often render the employment of an open Seat dangerous to health. The awnings also form an agreeable screen from the scorching sun at a later period. These Seats, whilst the most desirable, are not out of keeping in any position in the pleasure-grounds. The framework of the Seats above described is of iron, having laths of pitch pine or other durable wood bolted on to form the seat and back; the whole is painted or stained and varnished.

Of chairs, there is an almost endless variety; most of them are very light, and easy to transfer from place to place as occasion may require. They are framed of iron, with wood laths, as described above, or with light steel spring laths, which are more yielding than the wood. Some are made with elbow rests, some to fold up, and others to rock. The names given to these, in the trade, are “Desideratum,” “Gwyder,” “Spring lounges,” “French spring chairs,” &c. It is desirable that this class of garden furniture should be carefully stored in a dry loft or out-house, during the winter months, as its beauty very much depends upon the perfect state of the paint and varnish, and in the spring, when taken out, any defects should be attended to.

The Seats fitted with awnings, as already described, are movable; but others, of a more permanent kind, may often find a place, and will form, not only a very comfortable retreat, but also an agreeable feature in the scenery. Should a boundary wall require masking, a bench, say from 10ft. to 12ft. long, may be fixed against it. Over it a pitched roof may be constructed of boards supported on rustic posts at a convenient

**Seats—continued.**

height, and covered with rough bark or thatch, the ends being closed with boards, also covered with bark, or rough trellis work, and a floor constructed with pebbles or blocks of wood. The wall at the back should be lined with India matting, and a Rose or Honeysuckle trained over the structure, the width of which may be from 3ft. to 5ft. Similar Seats, but constructed independently of a wall, with bark or thatch coverings, may be erected in the more distant parts of the grounds, woods, &c., as shelters in case of sudden showers. In such places, they should have a closely-boarded back and ends, covered with rough bark or heather, and the structure should be flanked by shrubs. Cold draughts should be prevented from entering at the back of the Seat, by stuffing all crevices with moss, and, if a greater degree of ornamentation is desired, patterns in hazel rods or mosses may be worked on the inside surfaces.

**SEAWEEDS.** “A general term for the plants comprehended in the order *Algæ* of the Linnæan class *Cryptogamia*, known as flowerless plants. It includes not only plants growing in the sea, as the name Seaweed implies, but also in fresh water, and on moist earth, rocks, stone, and living and diseased vegetable substances, in the form of slime and jellies” (Smith).

Seaweeds are very largely used as manure in many districts around the British coasts, and in the Channel Islands, and are much esteemed for this purpose, owing to their richness in the foods required by plants, and to their rapid decay after being dug or ploughed into the ground. They are regarded as peculiarly useful in promoting the growth of Potatoes, and also as beneficial to Turnips; in fact, they especially assist the growth of plants that contain a good deal of water in their tissues when mature. Besides the Seaweeds themselves, the masses of them employed as manure have usually mixed up among them a good deal of decaying animal matter, from dead sea-animals on or in the plants, and this adds considerably to their value. They are very rich in Potash and Soda compounds, but rather poor in Phosphates; hence, it is well to mix with them some bone-dust, or other manure rich in Phosphates, before spreading them on the soil. See also **Manures**.

**SEBÆA** (named after Albert Seba, 1665-1736, an apothecary and botanical author, of Amsterdam). **ORD. Gentianeæ.** A genus comprising about eighteen species of stove or greenhouse, erect, annual herbs, natives of tropical and Southern Africa, Madagascar, Australia, and New Zealand. Flowers whitish or yellow, rather small, numerous, in corymbose cymes, or rarely few or solitary and long-pedicellate, or sub-sessile on the branches; calyx four or five-cleft or parted; corolla tube cylindrical, at length swollen, the lobes four or five, spreading, twisted; stamens four or five, the filaments short. Leaves sessile or stem-clasping, often small. The three species introduced are elegant plants. They require to be raised on a hotbed, and afterwards planted out in a warm, sheltered border, at the end of May.

**S. albens** (white). *fl.* whitish; sepals obtuse, connivent, striated; corolla lobes elliptic, obtuse, nearly equaling the ample, cylindrical tube. August. *l.* cordate-oblong. *h.* 6in. South Africa, 1820.

**S. aurea** (golden). *fl.* golden-yellow; calyx five-parted; corolla lobes elliptic-oblong, equaling the tube; stigma clavate; cymes dichotomous, many-flowered. July. *l.* lower ones cordate-triangular; upper ones ovate or lanceolate, all obtuse. *h.* 6in. South Africa, 1824.

**S. ovata** (ovate). *fl.* yellow; calyx five-parted, the segments ovate-lanceolate; corolla lobes ovate, slightly acute, one-half the length of the tube. August. *l.* ovate and somewhat rounded at base, slightly obtuse. *h.* 6in. Australia, 1820.

**SEBESTENS.** The fruits of *Cordia latifolia* and *C. Myra*.

**SECALE** (the ancient name used by Pliny, &c., said to have been derived from *seco*, to cut). **ORD. Gramineæ.** A small genus (two species, or varieties of one) of

**Secale**—continued.

hardy, annual, erect grasses, broadly dispersed over the Mediterranean region. Flowers in a dense, terminal spike. Leaves flat. *S. cereale* (Rye) as a corn crop in this country is gradually diminishing by the substitution of wheat.

**SECAMONE** (altered from *Squamona*, the Arabic name of *S. aegyptiaca*). ORD. *Asclepiadaceæ*. A genus comprising about two dozen species of stove, twining or decumbent, much-branched shrubs or sub-shrubs, natives of tropical and South Africa, tropical Asia and Australia, and the Mascarene Islands. Flowers small, often minute; calyx five-parted; corolla tube shortly rotate, deeply five-cleft; coronal scales five, shortly or deeply connate with the staminal tube; cymes loosely bi- or trichotomous, or clustered and few-flowered, sessile or shortly pedunculate. Leaves opposite, coriaceous or membranous, sometimes pellucid-dotted. Three species have been introduced, but they are probably lost to cultivation.

**SÉCATEUR**. An instrument used for pruning, extensively in France, and also, of late, in this country. Sécateurs are small, hand pruning-shears; there are various forms of them made. They can be used much more expeditiously than a pruning-knife for shortening summer shoots, pruning Roses, &c.; but they do not make a clean cut like a knife. See also **Pruning-Knives**.

**SECHIU** (said to be derived from *sekos*, a pen or fold; the fruit being sometimes used for fattening hogs in the West India Islands.) SYN. *Chayota*. ORD. *Cucurbitaceæ*. A monotypic genus. The species is a half-hardy, slightly hispid, climbing, perennial herb. The fruits are commonly employed as an article of food by the natives of the West Indies, being considered extremely wholesome; they are occasionally sent to England in a fresh state, and are sold in our markets under the name of Chayotes. The plant is grown in South Europe and in tropical Africa and America. For culture, see **Gourds**.

**S. edule** (edible). Chaco, Chayota, or Chocho Plant. *fl.* yellow, monœcious, disposed in elongated racemes, sub-fasciculate, shortly pedicellate; corolla rotate, deeply five-parted. June. *fr.* fleshy, about 4in. long, obovoid, oblong, or pear-shaped, sulcate, one-seeded. *l.* membranous, cordate, angled or lobed. Stems annual. Root large and fleshy, sometimes weighing nearly 20lb., resembling a yam in appearance, and having a similar flavour when cooked. *h.* 6ft. to 12ft. Native country unknown. 1816. (G. C. 1865, 51.)

**SECRETION**. Any organic, but unorganised, substance produced in the interior of plants.

**SECTILE**. Cut into small pieces: e.g., the pollen masses of some *Orchidaceæ*.

**SECTION**. A term generally applied, in classification, to a division in the arrangement of species, genera, or other groups.

**SECUND**. Turning to one side.

**SECURIDACA** (from *securis*, a hatchet; alluding to the form of the wing at the end of the pod). ORD. *Polygalaceæ*. A genus comprising about twenty-five species of stove, often climbing shrubs, mostly natives of the warmer parts of America, but four or five inhabit tropical Asia or Africa. Sepals unequal, the two largest petaloid and wing-like; two lateral sepals adnate to the staminal tube towards the base, erecto-connivent; keel concave-galeate, erect, or broadly three-lobed; stamens eight; racemes terminal and axillary, often paniced. Leaves alternate, usually entire and biglandular. The two species described below are pretty plants, thriving in a compost of loam, peat, and sand. Propagated readily by cuttings, inserted in sand, under a glass, in heat.

**S. erecta** (erect). *fl.* red, in dense, paniced racemes; posterior sepals spatulate, blunt; wings orbicular, equalling the shortly

**Securidaca**—continued.

bilobed keel. July. *l.* 1½in. to 2in. long, ovate-lanceolate, ovate, or oblong, pointed or blunt, puberulous beneath. *h.* 10ft. to 15ft. Tropical America, 1824. An erect shrub.

**S. virgata** (twiggy). *fl.* variegated, odorless, distant; corolla yellow; wings rosy on the outside, white within; racemes terminal, filiform, drooping. July. *l.* eight to ten lines in diameter, rounded at both ends or sub-emarginate; those of the flowering branchlets much smaller. West Indies, 1739. A high climber.

**SECURIDACA** (of Gærtner). A synonym of **Securigera** (which see).

**SECURIGERA** (from *securis*, a hatchet, and *gero*, to bear; referring to the shape of the pods). SYN. *Bona-veria*, *Securidaca* (of Gærtner). ORD. *Leguminosæ*. A monotypic genus. The species is a hardy annual, only requiring to be sown in the open border in spring.

**S. Coronilla** (Coronilla-like). Axe-weed; Hatchet Vetch. *fl.* yellow, at the tips of axillary peduncles, nodding; petals free of the staminal tube; standard sub-orbiculate. July. *l.* impari-pinnate; leaflets entire; stipules small, membranous. *h.* 1ft. South Europe, &c., 1562. (S. F. G. 712, under name of *Coronilla Securidacea*.)

**SECURINEGA** (from *securis*, a hatchet, and *nego*, to refuse; in reference to the extreme hardness of the wood). Including *Geblera*. ORD. *Euphorbiaceæ*. This genus embraces about eight species of stove, greenhouse, or hardy, branched shrubs, inhabiting temperate and tropical regions. Flowers monœcious or dioecious, apetalous, glomerate at the axils; males small, numerous, subsessile; females fewer or solitary. Leaves alternate, entire, often small. Only one species calls for description here, and it is doubtful if that is still cultivated. It thrives in any rich, loamy soil. Propagated readily by cuttings of the half-ripened wood, inserted in sand, under a glass, in heat.

**S. Commersoni** (Commerson's). A synonym of *S. durissima*.

**S. durissima** (very hard-wooded). Otaheite Myrtle. *fl.* white; males subsessile; females at length somewhat spreading, reflexed; calyx silky-pubescent. June. *l.* usually oblong-ovate, acute, shortly narrowed into the petioles. *h.* 35ft. Mauritius, &c., 1793. Stove. This is the *Bois dur* of the colonists. SYN. *S. Commersoni*, *S. nitida*.

**S. nitida** (shining). A synonym of *S. durissima*.

**SEDGES**. A common name for the *Cyperaceæ*, of which *Carex* is the principal genus.

**SEDUM** (from *sedeo*, to sit; alluding to the manner in which the plants fix themselves on rocks and walls). Orpine; Stonecrop. Including *Rhodiola*. ORD. *Crassulaceæ*. A genus comprising about 120 species of mostly hardy, glabrous or glandular-pubescent, fleshy, erect or

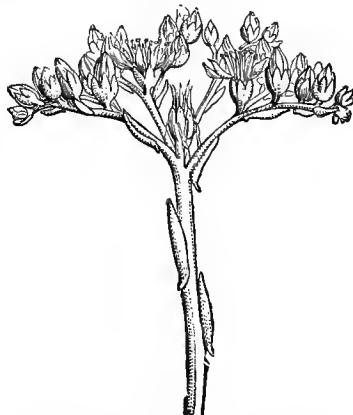


FIG. 463. INFLORESCENCE OF SEDUM.

decumbent, sometimes tufted or Musk-like herbs, rarely sub-shrubs, nearly all natives of the temperate and frigid regions of the Northern hemisphere; they are rare in America; one is found in Peru. Flowers white or yellow,

**Sedum—continued.**

rarely pink or blue, cymose (see Fig. 463), in a few cases axillary and solitary; calyx four or five-lobed; petals four or five (rarely six or seven), free; stamens eight to ten (rarely twelve to fourteen); filaments filiform or subulate. Leaves very variable, opposite, alternate, and whorled, entire or serrate, rarely lacinate. Sedums are amongst the easiest of plants to grow; like Saxifrages and Sempervivums, they succeed in almost any position, on rockwork, old walls, or ruins, or in the mixed border. Some are specially adapted for use in carpet bedding, *S. lydium* being an example. *S. acre*, and its variety *aureum*, though common, are plants much favoured by almost everybody, and allowed to spread extensively. *S. spectabile* is a fine, herbaceous border plant, also equally well adapted for pot culture. All Sedums are readily propagated by seeds, by cuttings, or by division of the tufts in spring. They prefer an open, loamy soil, and to grow amongst stones, but, as before noted, they thrive in almost any position.

By the assistance of the following key, adapted from Dr. Masters' admirable monograph on the "Hardy Stonecrops" (published in the "Gardeners' Chronicle" for 1878), any of the hardy species may be readily identified.

**I. Herbaceous Perennials.**

Flowers unisexual: *S. Rhodiola*.

Flowers bisexual.

Leaves narrow, entire, toothed, or deeply divided: *S. Aizoon*, *S. asiaticum*, *S. Maximowiczii*, *S. Middendorffianum*, *S. quadrifidum*, *S. rhodanthum*, *S. Selskianum*, *S. Semenovi*, *S. trifidum*.

Leaves flat, broad, toothed, but never deeply divided (TELEPHIUM group): *S. erythrostictum*, *S. maximum*, *S. spectabile*, *S. telephoides*, *S. Telephium*.

**II. Evergreen Perennials.**

Leaves flat and broad.

Leaves wholly, or at least those on the barren shoots, in tufts or rosettes: *S. Beyrichianum*, *S. Nevii*, *S. obtusatum*, *S. spatulifolium*, *S. ternatum*, *S. umbilicoides*.

Leaves scattered, not tufted.

Stems erect: *S. pomulifolium*.

Stems, at least the barren ones, prostrate, creeping.

Flowers yellow: *S. hybridum*, *S. japonicum*, *S. kamtschatkense*.

Flowers pink, rose-coloured, or white: *S. Anacamperos*, *S. Ewersii*, *S. oppositifolium*, *S. Sieboldi*, *S. stoloniferum*.

Leaves thick, more or less terete.

Leaves sharply pointed.

Flowers yellow or greenish-yellow: *S. amplexicaule*, *S. anopetalum*, *S. nicotense*, *S. pruinatum*, *S. reflexum*, *S. rupestre*, *S. sarmentosum*, *S. stenopetalum*.

Flowers lilac or white: *S. pulchellum*.

Leaves blunt at the tip.

Flowers yellow: *S. acre*, *S. Hildebrandi*, *S. sexangulare*.

Flowers white or pink: *S. album*, *S. anglicum*, *S. arboreum*, *S. brevifolium*, *S. dasyphyllum*, *S. farinosum*, *S. glaucum*, *S. lydium*, *S. monregalense*, *S. multiceps*.

**III. Annuals or Biennials.**

Stamens ten to twelve.

Leaves flat, tufted on the barren shoots: *S. sempervivoides*.

Leaves more or less cylindrical: *S. caeruleum*, *S. glandulosum*.

A selection of the best-known species is given below; they are hardy, herbaceous perennials, except where otherwise indicated. For most of the descriptions we are indebted to the monograph above quoted.

**S. acre** (bitter). Wall Pepper. *fl.* yellow, numerous,  $\frac{1}{2}$  in. across; sepals like the leaves, half the length of the lanceolate, spreading petals; cymes one-sided, two to five-forked; flower-stems erect,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. high. Summer. *l.* minute,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, crowded, thick, conical, obtuse, gibbous at base, having an acrid taste; those on the flower-stems scattered. Barren stems creeping, branched, about  $\frac{1}{2}$  in. long, slender-cylindrical, rooting near the base. Europe (Britain). Plant glabrous, evergreen. See Fig. 464. (Sy. En. B. 532.) The commonest British species, of which the following varieties are worth notice:

**S. a. aureum** (golden).\* *l.* and tips of the shoots bright golden-yellow in spring. A charming variety, admirably suited for spring bedding, or for giving colour at a dull time of the year. Less hardy than the type.

**Sedum—continued.**

**S. a. elegans** (elegant). *l.*, young ones and tips of the shoots of a pale silvery colour. This is not so effective as *aureum*, and is more delicate.

**S. a. majus** (large). *fl.*  $\frac{1}{2}$  in. across; sepals linear-oblong, slightly gibbous at base; petals twice the length of the sepals; cyme two-parted, with a central sessile flower, the branches recurved, one-sided. *l.* in seven rows, closely crowded, thick, deltoid-ovoid, scarcely auricled at base. Plant larger and more robust than the type. A distinct plant, regarded by Dr. Masters as "perhaps even deserving of specific rank."

**S. Aizoon** (Aizoon).\* *fl.* yellow, numerous,  $\frac{1}{2}$  in. in diameter, in a loose, panicle cyme,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in diameter; lower peduncles axillary, distant; upper ones umbellate, flat-topped. Late summer. *l.* distant, sessile, alternate,  $\frac{1}{2}$  in. by  $\frac{1}{4}$  in., oblong-lanceolate, coarsely and irregularly toothed for the greater part of their length; midrib prominent. Stems glabrous,  $\frac{1}{2}$  in. or more high, sub-angular, several from the same crown, erect, unbranched. Siberia, &c., 1757. An old inhabitant of our gardens.



FIG. 464. SEDUM ACRE.

**S. albicans** (whitish). A garden form of *S. Telephium*.

**S. album** (white).\* *fl.* white, nearly  $\frac{1}{2}$  in. across; petals lanceolate, spreading, twice the length of the calyx; cymes  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in diameter, corymbose, much-branched, many-flowered; flower-stems pinkish, erect,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. high. Summer. *l.* alternate, spreading,  $\frac{1}{2}$  in. long, linear-oblong, obtuse, contracted at base. Barren shoots erect or creeping, rooting, terete, olive-brown, sometimes slightly tubercled. Europe (Britain). Plant glabrous, tufted, evergreen, handsome when in flower. (Sy. En. B. 529.) SYNS. *S. farinosum* and *S. neglectum* (of gardens). The following are varieties:

**S. a. brevifolium** (short-leaved). *l.* shorter and thicker than in the type.

**S. a. micranthum** (small-flowered). *fl.* smaller than in the species. *l.* on the barren shoots ascending, not spreading, flattened on both surfaces.

**S. a. teretifolium** (terete-leaved). *fl.*, sepals and petals obtuse-*l.* much flattened above. (Sy. En. B. 529.)

**S. amplexicaule** (stem-clasping). *fl.* golden-yellow, numerous, secund; sepals furrowed outside; petals  $\frac{1}{2}$  in. long, keeled, twice the length of the sepals; cymes two-forked, leafy, with a solitary flower in the fork; flower-stems decumbent, ascending,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. Summer. *l.* dilated and membranous at base, tapering to a long, awl-shaped point; those of the flower-stems alternate, ascending, sessile,  $\frac{1}{2}$  in. long. Branches  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, wiry, ascending, clothed with imbricating leaves. Mediterranean region. A curious, glabrous, evergreen species. The ends of the shoots swell out into small, scaly tubers.

**S. Anacamperos** (Anacamperos). *fl.* violet, numerous, but rarely produced, about  $\frac{1}{2}$  in. in diameter; cymes dense, terminal, globose, with a few small leaves intermixed; flower-stems erect, terete, reddish. July. *l.* orbicular or obovate, obtuse, apiculate, cordate, auricled at base, with reddish margins. Branches erect, rooting at the nodes. Central Europe, 1596. Plant glaucous, evergreen. (B. M. 118.)

**Sedum—continued.**

- S. anglicum** (English). \* *fl.* pure white or rosy-tinted,  $\frac{3}{4}$  in. across; cymes less than half the length of the lanceolate petals; cymes dichotomous, few-flowered; flower-stems 2 in. long. July. *l.* crowded, alternate, sub-opposite, less crowded on the flower-stems, erect or spreading,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. Barren shoots trailing or erect, lin. to 2 in. long, forming dense, cushion-like masses. Western Europe (Britain). A neat and pretty, glabrous, evergreen species, suitable for rockeries. It is rather difficult to cultivate. (Sy. En. B. 531.)
- S. anopetalum** (erect-petaled). *fl.* pale greenish-yellow,  $\frac{1}{2}$  in. across; sepals five to seven, deltoid, grooved; petals erecto-patent, somewhat folded and keeled; cymes dense, flat or concave, umbellate, about lin. in diameter. July and August. *l.* in eight ranks, approximate, sessile, spreading (or on the flowering shoots ascending),  $\frac{1}{2}$  in. long, terete, awl-shaped, spine-tipped, greyish-green, red at the tips. Branches prostrate or ascending,  $\frac{1}{2}$  in. to 6 in. long. South Europe, 1818. Plant more or less glaucous, evergreen.
- S. arboreum** (tree-like). *fl.* white,  $\frac{1}{2}$  in. across, five-parted; petals lanceolate, keeled, twice or more longer than the linear-oblong sepals; cymes terminal, many-flowered. July. *l.* on older shoots deltoid, subulate, terete, or somewhat four-sided,  $\frac{1}{2}$  in. long, horizontally spreading; those on the young shoots more or less crowded, linear, terete, pimpled. *h.*  $\frac{1}{2}$  in. to 6 in. Native place unknown. Plant glabrous, suffrutescent, evergreen, with no separate barren shoots, branching from near the base, the branches spreading.
- S. asiaticum** (Asiatic). *fl.* greenish-yellow, in compact, terminal, globose cymes, numerous, five-parted; petals twice the length of the sepals; anthers orange-brown. Summer. *l.* opposite, decussate, spreading, sessile,  $\frac{1}{2}$  in. to lin. by  $\frac{1}{2}$  in. or more, linear-oblong, coarsely and irregularly toothed. Stems annual, 6 in. to 12 in. high, erect, unbranched, slender, glabrous. Himalayas. Half-hardy or greenhouse.
- S. Beyrichianum** (Beyrich's). *fl.* white,  $\frac{1}{2}$  in. across; sepals as long as the petals; cyme forked; fertile stems erect,  $\frac{2}{3}$  in. high, with numerous crowded, ascending leaves. *l.* in rosettes,  $\frac{1}{2}$  in. by  $\frac{1}{2}$  in., spatulate, obtuse, tapering to stalks, red-dotted. Native place unknown. Evergreen.
- S. brevifolium** (short-leaved). \* *fl.*  $\frac{1}{2}$  in. across; sepals whitish, with a pink midrib, oblong-lanceolate; petals also having a pink midrib, oblong, acute; cyme umbellate, two or three-forked, with a pedicellate flower in the centre of each fork. July. *l.* crowded, in four rows,  $\frac{1}{2}$  in. long, ovoid, pinkish, densely mealy-pubescent. France, &c. A beautiful little, densely tufted, glaucous, pruinose, evergreen species, with much the habit of *S. dasyphyllum*.
- S. carneum variegatum** (flesh-coloured, variegated). A form of *S. sarmentosum*.
- S. cœruleum** (blue). \* *fl.* pale blue, five to seven-parted,  $\frac{1}{2}$  in. in diameter; sepals half the length of the petals, both oblong, obtuse; cyme loose, many-flowered, lin. in diameter, with recurved branches. July. *l.* tufted,  $\frac{1}{2}$  in. long, oblong, obtuse, pale green, spotted with red. Stems 2 in. to 3 in. high, branched from the base. Mediterranean region, 1822. Plant glabrous or the inflorescence pilose. A charming little annual or biennial.
- S. collinum** (hill-loving). A garden synonym *S. reflexum*.
- S. corsicanum** (Corsican). A corruption of *corsicum*, a name which has been applied to forms of *S. dasyphyllum* and *S. maximum*.
- S. corsicum** (Corsican), of Duby. A synonym of *S. dasyphyllum glandulosum*.
- S. dasyphyllum** (thick-leaved). *fl.* pinkish,  $\frac{1}{2}$  in. across; petals lanceolate, three or four times the length of the fleshy sepals; cymes corymbose, loose, few-flowered. July. *l.* crowded, sessile, spreading, thick,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, oblong, acute, or sub-orbicular, pimpled. Stems tufted, slender, 2 in. to 3 in. long, branching. Europe (Britain). Plant glaucous, glabrous, or glandular, evergreen. (Sy. En. B. 530.) The form *glandulosum* (B. M. 6027), often met with in cultivation, is densely glandular-pubescent (SYN. *S. corsicum*, of Duby); while *oblongifolium* has oblong leaves.
- S. dentatum** (toothed). A garden synonym of *S. stoloniferum*.
- S. denticulatum** (slightly-toothed). A garden synonym of *S. stoloniferum*.
- S. elegans** (elegant). A synonym of *S. pruinatum*.
- S. erythrostictum** (blush-tinted). \* *fl.* greenish, nearly  $\frac{1}{2}$  in. across; petals spreading, lanceolate, flushed with pink, twice the length of the sepals; cymes terminal, corymbose. September. *l.* opposite or alternate, ascending,  $\frac{2}{3}$  in. by lin., concave, oblong, sinuate, obscurely toothed, entire and sub-cuneate or rounded at base, tapering into short petioles or quite sessile. Stem erect, greenish, 1 ft. to 1 ft. high. Japan. A handsome species. (Ref. B. 33 and R. C. 703, under name of *S. albo-roseum*.) The form *variegatum* has leaves blotched with yellow.
- S. Ewersii** (Ewers'). \* *fl.* pink or pale violet, numerous; petals twice the length of the sepals, dark-spotted; cymes dense, globose. August and September. *l.* opposite, sessile, about  $\frac{1}{2}$  in. in diameter, sub-orbicular, cordate-amplexicaul, entire or slightly sinuate. Stock thick, giving off many trailing or ascending, slender branches. Siberia, &c., 1829. A rather tender evergreen, well worth pot culture.

**Sedum—continued.**

- S. farinosum** (mealy). *fl.* white, crowded, five to seven-parted; sepals pink-tipped, linear-oblong, obtuse; petals lanceolate, acute, keeled; cyme two or three-parted. July. *l.* crowded in four to six rows, deciduous,  $\frac{1}{2}$  in. by  $\frac{1}{2}$  in., scarcely forming a rosette, oblong, obtuse. Stems tufted, cylindrical, much-branched. Madeira. Plant glabrous, glaucous, pruinose or mealy, rather tender, evergreen. Probably an outlying insular form of *S. album*.
- S. farinosum** (mealy), of gardens. A synonym of *S. album*.
- S. glandulosum** (glandular). \* *fl.* pale reddish-purple,  $\frac{1}{2}$  in. in diameter, usually alternate on short, recurved, simple or forked, terminal cymes; petals twice or thrice as long as the calyx. June. *l.* scattered, sessile,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, linear-oblong, obtuse, cylindric. Stems simple or forked, 2 in. to 6 in. long, sub-erect, decumbent or ascending. Spain, 1871. Whole plant glandular-hairy. Annual. (B. M. 5924.)
- S. glaucum** (glaucous). \* *fl.* pinkish-white,  $\frac{1}{2}$  in. across, six-parted; sepals deltoid, acute; petals oblong, sharp-pointed at apex; stamens twelve; cymes three to seven-branched, umbellate, the branches spreading, slightly pilose; flower-stems  $\frac{1}{2}$  in. to 4 in. long, reddish. July. *l.* densely crowded, about  $\frac{1}{2}$  in. long, linear, greenish-grey, becoming reddish, studded with fine hyaline pimples at the tips. Barren shoots 2 in. long, branched. Central and Southern Europe. A very pretty, glaucous, evergreen species, much used for carpet bedding and other purposes. The form *polypetalum* has seven to nine petals.
- S. Hildebrandi** (Hildebrand's). *fl.* bright yellow,  $\frac{1}{2}$  in. across; sepals lanceolate; petals lanceolate, acute; cyme branches  $\frac{1}{2}$  in. long. July. *l.*  $\frac{1}{2}$  in. long, densely packed, linear, turgid, subulate, erecto-patent, longer and narrower than in *S. acre*. Hungary. Plant glaucous, evergreen.
- S. hybridum** (hybrid). *fl.* yellow, numerous; sepals linear, obtuse, half as long as the apiculate petals; cymes terminal, much-branched, inversely pyramidal, 2 in. to 3 in. in diameter; peduncles horizontal or deflexed, with large, spreading bracts. Summer. *l.* alternate, stalked, about lin. by  $\frac{1}{2}$  in., spatulate, coarsely toothed in the upper half, entire and tapering in the lower part, the teeth red-tipped. Stems creeping, glabrous or glandular-hairy. Siberia, 1776. Evergreen.
- S. ibericum** (iberian). A garden form of *S. stoloniferum*.
- S. japonicum** (Japanese). \* *fl.* yellow,  $\frac{1}{2}$  in. in diameter; sepals oblong; petals lanceolate, acute, twice the length of the sepals; cymes loose, terminal and lateral, panicle, many-flowered. Summer. *l.* scattered or opposite, sub-reflexed, spreading, spatulate, oblong, acute, entire, convex below, channelled above, bright green. Stems diffuse. Japan, 1866. Evergreen. (R. G. 513, f. 3, 4.)
- S. kantschatkianum** (Kantschatkan). \* *fl.* yellow, numerous,  $\frac{1}{2}$  in. across; sepals deltoid, less than half as long as the spreading, apiculate, keeled petals; cymes terminal, umbellate, inversely pyramidal, lin. to 3 in. in diameter; peduncles radiating, with large bracts at base; flower-stems erect,  $\frac{1}{2}$  in. to 6 in. high. Late autumn. *l.* alternate or opposite,  $\frac{1}{2}$  in. by  $\frac{1}{2}$  in., oblong-obovate, deep green, toothed above the middle, gradually tapering to the petioles; edges minutely papillose. Branches 6 in. to 8 in. long, greenish or purplish. Stems prostrate. Kantschatka, 1829. Evergreen. SYN. *S. Selskjanum* (of gardens).
- S. Liebmannianum** (Liebmann's). *fl.* whitish-pink, small, sessile; cymes terminal, three to five-flowered. Summer. *l.* sessile, clustered, fleshy, shining, spreading, conical, one to two lines long, scarcely acute. Branches red, ascending. *h.* 3 in. to 4 in. Mexico, 1880. Greenhouse perennial.
- S. lividum** (livid). A garden synonym of *S. lydium*.
- S. lydium** (Lydian). \* *fl.* pinkish,  $\frac{1}{2}$  in. across; petals twice as long as the sepals; cyme corymbose, many-flowered; flowering shoots 4 in. to 5 in. long. Late summer. *l.* crowded,  $\frac{1}{2}$  in. long, linear, sub-terete, greenish or red-tipped, auricled at base, tipped with numerous very minute pimples. Barren shoots 2 in. to 3 in. high, erect, purplish. Asia Minor, 1867. A charming little, glabrous evergreen for rockwork edgings or carpet bedding. SYN. *S. lividum* (of gardens).
- S. Maximowiczii** (Maximowicz's). *fl.*, yellow, numerous, in a dense, flat, spreading cyme; sepals unequal, protracted into a long, slender point; petals half as long again as the sepals. Late summer. *l.* sub-opposite or alternate, sub-sessile, lin. to  $\frac{1}{2}$  in. long, oblong-ovate or oblong-lanceolate, sometimes obtuse, regularly toothed, the midrib channelled; upper ones longer and narrower. Stems erect, about 1 ft. high, terete or somewhat four-sided, greenish. Japan, Amur.
- S. maximum** (largest). \* *fl.*, sepals deltoid-lanceolate, half the length of the lanceolate, whitish petals, whose tips are spotted with red; cymes terminal and lateral, on long stalks, forming a loose panicle, sub-globose, many-flowered, the lowest stalks usually longest. August and September. *l.* opposite, sessile, spreading, stem-clasping, 2 in. long, ovate, acute, more or less cordate, crenate-toothed. Stems 1 ft. to 2 ft. high, erect, green or purple. Europe and Asia. The following varieties are enumerated by Dr. Masters:
- S. m. assurgens** (increasing). *fl.* pinkish; cymes corymbose; inflorescence loose. *l.* ascending, opposite, green, oblong, obtuse, sinuate. Stem weak, ascending, green.

**Sedum**—continued.

- S. m. cordifolium** (cordate-leaved). *fl.* whitish, with red spots,  $\frac{1}{2}$  in. across; petals concave; inflorescence corymbose. *l.* alternate and opposite, spreading horizontally, oblong-ovate, sinuate-toothed. Stems purplish. (Ref. B. 34, under name of *S. cordifolium*.)
- S. m. corsicum** (Corsican). *fl.* pale yellow, with a pleasant, apple-like fragrance; inflorescence corymbose. *l.* alternate and opposite, spreading, oblong-ovate, toothed, green. Stems purplish.
- S. m. hamatodes** (bloody).\* *fl.* whitish, the petals tipped with red; cymes numerous, long-stalked, forming a large, loose, inversely pyramidal panicle, with a few scattered leaves. September. *l.* opposite,  $\frac{1}{2}$  in. by  $\frac{3}{4}$  in., oblong-ovate, obtuse, subcordate, coarsely-toothed, purplish. Stems deep purple, erect, 2 ft. to 2½ ft. high, glabrous. Portugal. A really noble plant, of robust habit.
- S. m. pachyphyllum** (thick-leaved). *fl.* greenish-yellow; cymes globose, long-stalked, forming a loose, terminal panicle. *l.* opposite, spreading, cordate-ovate, serrulated. Stems reddish.
- S. m. præruptorum** (overhanging). *fl.* greenish; cymes globose, on long stalks. *l.* recurved, finely toothed. Stems green.
- S. m. recurvum** (recurved). *fl.* greenish-yellow; cymes in a loose, terminal panicle. *l.* opposite, oblong-ovate, irregularly toothed, recurved. Stems green.
- S. m. rigidum** (rigid). *fl.* greenish; inflorescence loosely corymbose. *l.*, canine ones opposite, sessile, ovate-oblong, obtuse, slightly and irregularly sinuate-toothed. Stems deep red, 2 ft. to 3 ft. high.
- S. m. Rodigasi** (Rodigas'). A form having purplish leaves, variegated with yellow. In cultivation, it is more tender than most of the varieties of *S. maximum*. (F. d. S. 1669.)
- S. m. serotinum** (late). *fl.* greenish-yellow; inflorescence loosely paniced. *l.* opposite, the upper ones ternate, spreading, ovate-oblong, sinuate-toothed, green. Stems green, weak.
- S. m. ternatum** (ternate). *fl.* yellowish; inflorescence corymbose. *l.* reddish above, dark green below, in whorls of three. Stems red.
- S. m. triphyllum** (three-leaved). *fl.* in terminal corymbs. *l.* ternately whorled, oblong, serrated.
- S. Middendorffianum** (Middendorff's). *fl.* yellow, numerous, in a flat-topped, umbellate cyme; petals spreading,  $\frac{1}{2}$  in. longer than the sepals; primary branches four, with a central flower in the forks. Summer. *l.* alternate, rather fleshy, sessile,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, erecto-patent, oblanceolate, toothed towards the apex, somewhat concave below. Amur, 1880. The variety *minor* is dwarfier in all its parts.
- S. monregaleense** (Monregalensis). *fl.* white,  $\frac{1}{2}$  in. across, five-parted; sepals pink-spotted, one-third the length of the petals; petals pinkish-brown and pubescent beneath; cyme loose, terminal, many-flowered, paniced, glandular-pubescent. Summer. *l.* on barren shoots crowded, spreading, thick,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long; those on fertile shoots scattered, narrower, often spotted with pink. Barren shoots spreading, erect, or creeping,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, rooting at the nodes. North Italy. A pretty, dwarf, glabrous (except the inflorescence) evergreen.
- S. montanum** (mountain-loving). A mere catalogue name, under which no plant has been botanically described.
- S. multiceps** (many-stemmed). *fl.* pale yellow,  $\frac{1}{2}$  in. across, five-parted; sepals linear-oblong, obtuse, half the length of the oblong-lanceolate, spreading petals; cymes sub-scorpoid, many-branched, two to six-flowered; flower-stems erect, twice the length of the barren ones. Summer. *l.*  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, glaucous or pruinose, pinkish and papillose, linear and oblanceolate, sub-terete, gibbous at base, spreading on the barren, appressed on the fertile, stems. Branches 2 in. to 6 in. long, flexuous or erect, giving off adventitious roots, and bearing at the ends dense rosettes of leaves. Algeria. Plant sub-shrubby, much-branched, glaucous, evergreen. (G. C. n. s., x. p. 120.)
- S. neglectum** (neglected), of gardens. A synonym of *S. album*.
- S. Nevii** (Dr. Nevius'). *fl.* white, numerous,  $\frac{1}{2}$  in. across; sepals half the length of the lanceolate petals; cymes forked, the branches  $\frac{1}{2}$  in. long, recurved, with a few leafy bracts; flowering stems erect, 2 in. to 3 in. high. July. *l.* on barren shoots crowded in terminal rosettes, each  $\frac{1}{2}$  in. by  $\frac{3}{4}$  in., obovate-spathulate, tapering into a short stalk, auricled at base, pink-dotted; those on the fertile stems appressed, scattered, smaller than the others. Stems prostrate. North America. Evergreen.
- S. nicaense** (Nice). *fl.* greenish-yellow,  $\frac{1}{2}$  in. in diameter, five or six-parted; petals boat-shaped, twice the length of the sepals; cymes many-flowered, terminal, umbellate; flowering stems erect, 10 in. to 12 in. high. Late summer and autumn. *l.* of the barren shoots  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, less than  $\frac{1}{2}$  in. wide, ascending or spreading; those of the flowering shoots appressed, lanceolate, distinctly auricled. Stems 6 in. to 8 in. long, at first prostrate, afterwards ascending; rootstock thick, woody. Mediterranean region. Evergreen. (A. F. p. iii. 90.)
- S. obtusatum** (obtuse). *fl.* yellow,  $\frac{1}{2}$  in. across, shortly pedicellate; petals lanceolate, more than double the length of the oblong, acute sepals; cymes terminal, spreading, umbellate,  $\frac{1}{2}$  in. to 2 in. in diameter; flower-stems erect, terete, reddish, ultimately leafless, but scarred. June and July. *l.* rosulate,

**Sedum**—continued.

lin. by  $\frac{1}{2}$  in., spathulate, entire, glaucous, becoming reddish-green. Stems prostrate, glaucous, pruinose. California. Evergreen.



FIG. 465. SEDUM OPPOSITIFOLIUM.

- S. oppositifolium** (opposite-leaved). *fl.* whitish, resembling those of *S. stoloniferum*; fertile stems 6 in. high, erect. August. *l.* opposite, decussate,  $\frac{1}{2}$  in. by  $\frac{1}{2}$  in., sub-orbicular or rhomboid, tapering to short-chamelled stalks, bright green, crenate-ciliate at the edges; younger ones crowded at the ends of the branches. Stems rough with minute asperities. Caucasus. Trailing evergreen. See Fig. 465. (B. M. 1807.)
- S. populifolium** (Poplar-leaved). *fl.* whitish or pinkish, numerous, nearly  $\frac{1}{2}$  in. across, with the fragrance of Hawthorn; petals three times longer than the sepals; cymes terminal, much-branched, corymbose. August. *l.* alternate,  $\frac{1}{2}$  in. by  $\frac{1}{2}$  in., stalked, ovate, acute, sub-cordate, coarsely and irregularly toothed. Stems erect, 6 in. to 10 in. high, greenish or purplish, slender, branched. Siberia, 1780. Plant glabrous, suffrutescent, evergreen. Though quite hardy, it forms a charming greenhouse subject.
- S. pruinatum** (pruinose). *fl.* bright yellow,  $\frac{1}{2}$  in. in diameter, four to eight-parted; sepals acute, half as long as the obtuse, concave petals; cyme at first recurved, umbellate, many-branched, flat-topped; flower-stems erect, 1 ft. high. Late summer. *l.* in many rows, sessile, crowded, spreading, slightly incurved at the ends of the sterile shoots, glaucous-blue, often tipped with rose-pink, about  $\frac{1}{2}$  in. long, linear-oblanceolate, aristate; those of the flowering shoots larger and less crowded. Branches 6 in. to 8 in. long, trailing, ascending. Europe (Britain). Plant glaucous, pruinose, evergreen. SYN. *S. elegans* (Sy. En. B. 806).
- S. p. Forsterianum** (Forster's). *l.* on the barren shoots many-ranked, forming terminal rosettes, spreading, pale green, oblanceolate, mucronulate, gibbous at base. Plant glabrous or slightly glaucous. SYN. *S. rupestre Forsterianum*.
- S. p. minus** (lesser). *l.* oblanceolate, mucronate, in rosettes. Plant glaucous, smaller in all its parts than the type. SYN. *S. rupestre minus*.
- S. pulchellum** (pretty).\* *fl.* rosy-purple,  $\frac{1}{2}$  in. across; petals lanceolate, acuminate, half as long again as the linear-oblong sepals; cyme three or four-branched, with erect flowers crowded in two rows along the upper surface, and each provided with a leafy bract. Branches slender, trailing, or ascending, 3 in. to 6 in. long. United States, 1874. A very handsome, but little-known, evergreen species. (B. M. 6223; G. C. 1878, 114.)
- S. quadrifidum** (four-cleft). *fl.* red, in terminal cymes; sepals oblong; petals linear-oblong, twice as long as the sepals. July. *l.* glabrous or puberulous, approximate, sub-terete,  $\frac{1}{2}$  in. long. Stem thick, giving off numerous erect, slender stems, 2 in. to 5 in. high. Arctic Russia, &c., 1809.
- S. reflexum** (reflexed).\* *fl.* yellow,  $\frac{1}{2}$  in. across, four to eight-parted; sepals half as long as the linear petals; cymes umbellate, leafy, many-flowered, many-branched, with a flower in each fork; flower-stems erect, 8 in. to 10 in. high. Summer. *l.* in six or seven rows, crowded on the barren stems into a conical mass,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, linear-subulate, terete, gibbous at base, spreading or abruptly decurved. Stems trailing. Europe (Britain). Plant glabrous, scarcely glaucous, evergreen. SYN. *S. collinum* and *S. virens* (of gardens). The following varieties are enumerated by Dr. Masters:
- S. r. albescoens** (whitish). *fl.* yellowish-white,  $\frac{1}{2}$  in. across, often six-parted; sepals acute. *l.* rarely in rosettes. Plant glaucous.
- S. r. cristatum** (crested). This resembles the type; but the stems are fasciated so as to form a crest, as that of the Cockscomb.
- S. r. minus** (lesser). The smallest variety of all.
- S. r. septangulare** (seven-angled). *l.* scarcely glaucous, usually somewhat thicker than in *albescoens*, and arranged in seven distinct rows, often spirally wound round the stem.



**Sedum—continued.**

- S. r. virescens** (greenish). This only differs from *albescens* in having pale sulphur-yellow flowers.
- S. retusum** (retuse-leaved). *fl.* white, with a rosy centre,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in diameter, arranged in small, dense, terminal clusters. June. *l.* green, shining, obovate-oblong, retuse,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. Branches grey, mealy when young, leafy only at the tips. Mexico, 1880. (Greenhouse.)
- S. rhodanthum** (rose-flowered). *fl.* rose-coloured, numerous, in a dense, terminal cyme  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, mostly four-parted; sepals linear; petals lanceolate, acuminate, twice as long as the sepals. End of June. *l.* alternate, lanceolate, entire, channelled,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. Stems tufted,  $\frac{1}{2}$  ft. to  $\frac{3}{4}$  ft. high, erect. Rocky Mountains of Utah and Colorado.
- S. Rhodiola** (Rhodiola).\* *fl.* greenish or reddish-purple, in a terminal, flat-topped, sub-globose cyme, about  $\frac{1}{2}$  in. in diameter; petals four; pedicels short. Summer. *l.* scattered, glaucous, spreading or erect,  $\frac{1}{2}$  in. by  $\frac{1}{4}$  in., sessile, oblong, obtuse, rounded at base, obscurely one-nerved, slightly toothed at apex. Stems annual, several from the same stock,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. high, erect, unbranched. Europe (Britain), &c. The roots exhale a perfume of rose-water. (Sy. En. B. 525.) SYN. *Rhodiola rosea. linifolia* (R. G. 1080) is a Turkestan form, with narrow leaves and brightly-coloured flowers. *minor* is a small form.
- S. rupestre** (rock-loving). *fl.* clear yellow, numerous, barely  $\frac{1}{2}$  in. in diameter, five to seven-parted; sepals ovate-oblong, obtuse; petals similar, concave, not keeled; cymes umbellate, three to five-forked, ultimately hollow-topped; stalks  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. July. *l.*  $\frac{1}{2}$  in. long, in very numerous rows, linear-subulate, incurved, convex below, flattish above, forming dense, obconical rosettes  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in diameter, at the ends of the sterile branches. Western Europe (Britain). Plant glaucous, evergreen, but reddening with age and drought.
- S. r. Forsterianum** (Forster's). A synonym of *S. pruvinatum* *Forsterianum*.
- S. r. minus** (lesser). A synonym of *S. pruvinatum minus*.
- S. sarmentosum** (sarmentose).\* *fl.* bright yellow, numerous,  $\frac{1}{2}$  in. in diameter; sepals fleshy, half the length of the lanceolate petals; inflorescence a flat-topped, umbellate, three to five-forked cyme, with a solitary flower in the forks. *l.* crowded, opposite, or whorled,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, linear, terete or slightly flattened, apiculate, slightly gibbous at base; those of the flower-stem scattered, ascending. China. Greenhouse evergreen. There is a variety of this with pink stems, and having leaves marked with a marginal stripe of white or cream-colour; it is grown in greenhouses and for carpet beds under the name of *S. carneum variegatum*.
- S. Selskyaanum** (Selsky's). *fl.* yellow, numerous in a many-branched, hollow-topped, leafy cyme, the rachis flexuous; corolla nearly  $\frac{1}{2}$  in. across, half as long again as the calyx. Late summer. *l.* sessile, ascending; upper ones  $\frac{1}{2}$  in. long, less than  $\frac{1}{2}$  in. broad, lanceolate from a broad base, ciliated; midrib very prominent on the under surface; margin serrated in its distal third. Stems  $\frac{1}{2}$  ft. to  $\frac{3}{4}$  ft. high, erect, pilose. Amur and Manchuria.
- S. Selskyaanum** (Selsky's), of gardens. A synonym of *S. kamtschaticum*.
- S. Semenovii** (Semenov's). *fl.* whitish,  $\frac{1}{2}$  in. or more in diameter, in compact, terminal, globose cymes; sepals reddish, longer than the tube; petals tipped with pink. June. *l.* in six rows, erectopate, sessile, about  $\frac{1}{2}$  in. long, linear, acute, entire, one-nerved, channelled above. Stems annual, from a many-headed rhizome, erect, cylindrical, glabrous, about  $\frac{1}{2}$  ft. high. Turkestan.
- S. sempervivoides** (Sempervivum-like).\* *fl.* bright red; sepals deltoid, acute, pilose; petals  $\frac{1}{2}$  in. long, lanceolate, acute; cyme many-flowered, panicled,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in diameter; peduncle pilose. July. *l.* of the rosette forty to fifty, obovate-cuneate,  $\frac{1}{2}$  in. by  $\frac{1}{4}$  in.; those of the flower-stem clasping, greenish-red, oblong, acute. *h.*  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. Asia Minor. A remarkably handsome, pubescent, annual or biennial species.
- S. sexangulare** (six-angled). *fl.* yellow,  $\frac{1}{2}$  in. across; petals lanceolate, double the length of the linear-oblong sepals; cyme three to five-branched, umbellate,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. across, with scorpioid, one-sided branches; flower-stems erect,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. high, very slender. July. *l.* densely crowded in six or seven rows, spreading or ascending, about  $\frac{1}{2}$  in. long, linear-cylindric. Barren shoots ascending,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, branched. Europe (Britain). (Sy. En. B. 533.) Plant glabrous, evergreen. A neat-habited species.
- S. Sieboldi** (Siebold's).\* *fl.* pinkish, numerous,  $\frac{1}{2}$  in. across; petals having a green spot on the back near the top, three times as long as the sepals; cymes much-branched, umbellate; pedicels longer than the flowers. August. *l.* in whorls of three, sessile or nearly so, spreading, sub-orbicular, sinuate, cuneate at base, bluish-green, pinkish on the margins. Branches terete, slender, purplish, erect, afterwards recurved. *h.*  $\frac{1}{2}$  in. Japan, 1836. (Greenhouse or half-hardy evergreen. (B. M. 5358.)
- S. S. medio-variegatus** (variegated-centred). This differs from the type in having a central blotch of creamy-white on each leaf. (I. H. 373.)
- S. spatulifolium** (spatulate-leaved). *fl.* yellow, numerous,  $\frac{1}{2}$  in. across; sepals half the length of the acuminate, keeled petals; cymes terminal, forked, the branches  $\frac{1}{2}$  in. long. May

**Sedum—continued.**

- and June. *l.*, upper ones on the barren shoots about fifteen in a terminal rosette,  $\frac{1}{2}$  in. in diameter; lower ones and those of the flower-stem scattered, spreading,  $\frac{1}{2}$  in. by  $\frac{1}{4}$  in.; those of the flower-stem club-shaped. Branches creeping or ascending,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. North-west America, 1873. Evergreen. (G. C. n. s., v. 146; R. G. 741.)
- S. spectabile** (remarkable).\* *fl.* pink, numerous,  $\frac{1}{2}$  in. across; sepals whitish; petals twice the length of the sepals, slightly concave; cymes large, flat-topped, inversely pyramidal, leafy, umbellate. September. *l.* opposite, decussate, or in horizontally-spreading whorls of three,  $\frac{1}{2}$  in. by  $\frac{1}{4}$  in., flat, scarcely petiolate or the upper ones quite sessile, ovate, obtuse, or spatulate, entire or obscurely toothed, slightly cuneate at base. Stem  $\frac{1}{2}$  ft. to  $\frac{3}{4}$  ft. high. Probably Japan. A robust and noble species. (Ref. B. 32; R. G. 709; I. H. viii. 271, under name of *S. Fabaria*.)
- S. spurium** (spurious). A synonym of *S. stoloniferum*.
- S. stenopetalum** (narrow-petaled). *fl.* bright yellow, five-parted; petals linear-lanceolate, acuminate, twice longer than the awl-shaped sepals; cymes much-branched, scorpioid. *l.* numerous, crowded on the barren shoots, sessile, fleshy, lanceolate,  $\frac{1}{2}$  in. long. Stems  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, erect from a decumbent base, simple or somewhat branched. Rocky Mountains, 1877. Plant glabrous, evergreen.
- S. stoloniferum** (stolon-bearing). *fl.* pink or white, numerous,  $\frac{1}{2}$  in. in diameter; petals nearly twice the length of the sepals; cymes terminal, umbellate,  $\frac{1}{2}$  in. in diameter; ultimate pedicels shorter than the flowers; flower-stems  $\frac{1}{2}$  in. long, ascending, reddish. July and August. *l.* opposite,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, cuneate-spatulate, coarsely toothed above the middle, tapering into short stalks, the margins studded with hyaline papillae. Barren stems trailing, sometimes brown-dotted, rooting at the nodes. Caucasus. Evergreen. SYNS. *S. dentatum* and *S. denticulatum* (of gardens), *S. spurium* (B. M. 2370). *S. ibericum* (of gardens) is a small, slender form, with white flowers and ciliolate leaves.
- S. telephioides** (Telephium-like). *fl.* small, numerous; petals falcate, hooded at the tip; cymes small, dense,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in diameter. June. *l.* scattered,  $\frac{1}{2}$  in. by  $\frac{1}{4}$  in., oblong-obovate, obtuse, nearly entire or sparingly toothed, cuneate at base. Stem  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. high. North America, 1810. Plant glabrous.
- S. Telephium** (Telephium). *fl.* pink, white-spotted, or sometimes pure white, numerous, in dense, terminal or lateral, sub-globose, stalked cymes; calyx tube very short, the sepals lanceolate; petals spreading, somewhat recurved; peduncles short and nearly equal. August and September. *l.* scattered, rarely opposite, ascending or spreading,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. broad, oblong-ovate, obtuse, toothed; lower ones cuneate at base; upper ones somewhat rounded. Stem erect,  $\frac{1}{2}$  ft. to  $\frac{3}{4}$  ft. high. Europe (Britain). *S. T. Fabaria* is a sub-species, having flowers smaller, appearing earlier; petals less recurved; peduncles short, arranged in a terminal cyme. Leaves narrower than in the type, the lower ones slightly stalked. To *S. Telephium* and its sub-species may be referred a large number of more or less constant forms, of which the following are described by Dr. Masters:
- S. T. affine** (related). *fl.* pink,  $\frac{1}{2}$  in. across; sepals one-third the length of the spreading petals; cymes terminal, loosely fastigate. August. *l.* alternate, sessile,  $\frac{1}{2}$  in. by  $\frac{1}{4}$  in., ovate-oblong, acute irregularly toothed above. Stem  $\frac{1}{2}$  ft. to  $\frac{3}{4}$  ft. high, greenish or red-spotted.
- S. T. arduennense** (Ardennes). *fl.* whitish,  $\frac{1}{2}$  in. across; sepals deltoid, one-third the length of the erect-petate petals; cymes numerous, forming a loose, terminal panicle. August. *l.* cauline ones alternate, appressed, nearly  $\frac{1}{2}$  in. by  $\frac{1}{4}$  in., ovate-oblong, obtuse. Stems purplish,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. high.
- S. T. Borderi** (Border's). *fl.* pink; cymes corymbose, flat-topped. *l.* distinctly stalked, oblong, obtuse, tapering to the base, irregularly and coarsely toothed. Stems reddish.
- S. T. Brunfelsii** (Brunfels). *fl.* pink,  $\frac{1}{2}$  in. across; sepals one-third the length of the spreading, oblong-lanceolate petals; cymes terminal, rounded. August. *l.* glaucous, appressed, sessile, oblong-obovate,  $\frac{1}{2}$  in. by  $\frac{1}{4}$  in., irregularly toothed, reddish along the midrib. Stem  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. high.
- S. T. Julianum**. *fl.* greenish, ultimately pinkish,  $\frac{1}{2}$  in. across; sepals one-third the length of the lanceolate petals; cymes terminal and lateral, compact, forming a large, terminal panicle. August. *l.* alternate, appressed,  $\frac{1}{2}$  in. by  $\frac{1}{4}$  in., obovate, irregularly toothed in the upper half. Stems  $\frac{1}{2}$  ft. to  $\frac{3}{4}$  ft. high, finely spotted.
- S. T. lugdunensis** (Lyons). *fl.* rose-pink; cymes numerous, loosely corymbose, on long stalks. *l.* in whorls of three, spreading or ascending, rounded at base, coarsely toothed. Stems stout.
- S. T. occidentale** (Western). *fl.* pinkish,  $\frac{1}{2}$  in. across; sepals deltoid-linear; petals spreading, lanceolate; cymes numerous, many-flowered, leafy. August and September. *l.* alternate, ascending,  $\frac{1}{2}$  in. by  $\frac{1}{4}$  in., obovate-oblong, obtuse, tapering to the base, toothed in the upper two-thirds; upper ones sub-cordate. Stems reddish, robust.
- S. T. pycnantha** (dense-flowered). *fl.* greenish; cymes globose, the lower ones on long stalks; inflorescence compact, many.

**Sedum**—continued.

cymed. *l.* alternate, ascending, tapering at both ends. Stem green.

**S. T. rhodanensis** (Rhône). *fl.* pink; cymes corymbose, globose, long-stalked. *l.* alternate, spreading, tapering to the base and apex, coarsely toothed.

**S. T. rubella** (reddish). *fl.* pink; cymes globose, the lower ones on long, horizontal stalks, forming an elongated, oblong panicle. *l.* red, tapering to the base, narrow-oblong, coarsely toothed. Stems red.

**S. T. thyrsoidum** (thyrsoid). *fl.* greenish or yellowish,  $\frac{1}{2}$  in. in diameter; cymes numerous, globose, many-flowered, on long, ascending stalks, forming a large, compact panicle. August and September. *l.* opposite or whorled; lower ones ascending,  $\frac{3}{4}$  in. by lin., oblong, acute, toothed in the upper two-thirds; upper ones smaller, sub-cordate. Stems about 2 ft. high, reddish.

The following other forms of *S. Telephium* have been mentioned: *albicans*, *Bulliardii*, *Carioni*, *contracerasum*, *corymbiferum*, *grandidentatum*, *intermedium*, and *Lobellii*.

**S. ternatum** (ternate). *fl.* white,  $\frac{1}{2}$  in. across, four-parted; sepals oblong, obtuse; petals oblong, acute, twice the length of the sepals; flower-stems erect. July and August. *l.*  $\frac{1}{2}$  in. long, in whorls of three, sub-orbicular-spathulate, crowded into rosettes at the ends of the barren stems; those of the fertile stems scattered, ascending or spreading, oblong, acute. Barren stems 6 in. to 8 in. long, prostrate. North America, 1789. A glabrous or glaucous evergreen. (B. M. 1977; B. R. 142.)

**S. trifidum** (trifid). *fl.* at first reddish, in small, dense, terminal cymes; petals linear-lanceolate, twice the length of the lanceolate sepals. Summer. *l.* glabrous, aggregated towards the top of the stem, sessile, spreading, oblong, cuneate at base, coarsely toothed or pinnatifid. Stems erect, slender,  $\frac{3}{4}$  in. to 7 in. high, unbranched. Temperate Himalayas.

**S. umbilicoides** (Umbilicus-like). *fl.* white, seven-parted; inflorescence long-stalked, cymose. *l.* rosulate, convex, oblong-lanceolate. Alatan, Turkestan. Evergreen. (R. G. 917.)

**SEED.** Seeds are met with only in flowering plants, and are the result of the union of the male and female elements, for the reproduction of the species. They are the ovules, fertilised by the action of the pollen, and subsequently ripened (see **Ovule**); and each contains an embryo (rarely two or more), i.e., a young plant, capable, when the Seed is placed in suitable conditions, of becoming, in all points, like its parents. The existence of an embryo in Seeds affords a sharp distinction between them and the spores of Cryptogams, which correspond with them in function, but are very often one-celled, and never contain an embryo. A reference to the account given under **Ovule** will facilitate the explanation of the changes that the ovules undergo in

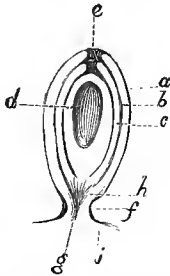


FIG. 466. ORTHOTROPOUS OVULE IN SECTION, showing two Coats (*a*, *b*), with the Micropyle (*e*), the Nucellus (*c*), and the Embryo-sac (*d*). The signification of the other letters is as follows: *f* is the Funiculus or Stalk; *g*, the Raphe, or Fibro-vascular Bundle in the Stalk; *h*, the Chalaza, where the Stalk afterwards breaks off, and leaves the Hilum or Scar; *i*, the Placenta from which the Ovule grows.

becoming Seeds. In the unfertilised ovule (see Figs. 466 and 467), there are generally two coats, surrounding a central cellular mass called the nucellus; but there is a passage (micropyle) at the true apex of the ovule, through both coats. In the middle of the nucellus lies a large cell, the embryo-sac, formed by the union of two or more cells. Within this sac are several cells (see Fig. 468), viz., at the end next the micropyle two oval or elongated cells, the "helper cells," with a round cell (two in *Santalum album*) at their inner end, called the embryonal

**Seed**—continued.

vesicle. At the opposite end of the embryo-sac are three others, called antipodal cells, which are believed to be the last traces of a prothallus, such as is formed in *Selaginella* among Vascular Cryptogams. Among the protoplasm that lines the walls of the embryo-sac as a thin layer, two nuclei may generally be distinguished. After fertilisation, i.e., after the pollen tube has reached the embryonal vesicle through the micropyle, the helper

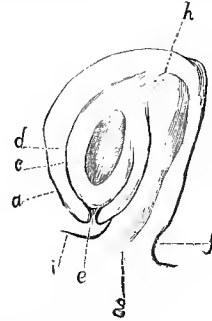


FIG. 467. ANATROPOUS OVULE OF *ACTEA SPICATA*, IN SECTION. Only one Coat (*a*) exists on it (other lettering as in Fig. 466).

cells and the antipodal cells disappear; the cell wall of the embryonal vesicle becomes thicker, and the cell grows, and becomes divided by cross-walls. At last it forms a cellular mass, the embryo, on the end of the suspensor, which part in most plants is a row, but in some is a mass, of cells. In the embryo of the ripe Seed, it is generally easy to make out radicle, stem, plumule, and one or two cotyledons. Thus, in it all the vegetative

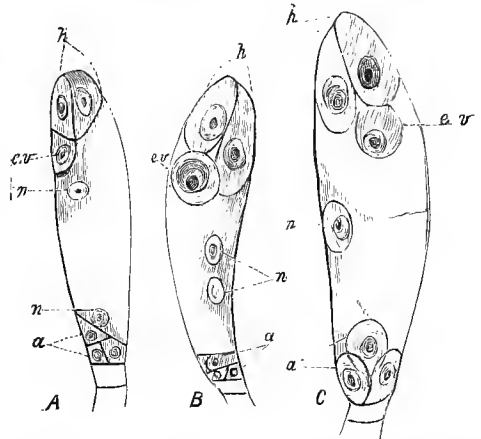


FIG. 468. EMBRYO-SAC OF ANGIOSPERM BEFORE FERTILISATION, IN THREE STAGES, showing (*h*) Helper Cells, (*e v*) Embryonal Vesicle, (*a*) Antipodal Cells, and (*n*, *n*) Nuclei. In A, the Helper and Antipodal Cells, and the Embryonal Vesicle, are still angular, and the two Nuclei are wide apart; in B, the Embryonal Vesicle is rounded, and the Nuclei lie close together; in C, the Embryonal Vesicle is ready to be fertilised, the two Nuclei are united to form one, and the Antipodal, as well as the Helper Cells are rounded off.

organs of the future plant are represented, except in a few families (e.g., Orchids), in which the embryo is only a mass of cells, without distinction of parts. In *Conifere*, the course of development of the ovule into the Seed is different in several respects; but the result is much the same as regards the structure of the mature Seed. While the embryo is in course of development, the nuclei of the embryo-sac give rise to the endosperm. At first, this consists of cells free from one another, but soon



**Seed—continued.**

they come into contact, and, by their union, form a tissue that quite resembles those formed by ordinary cell-divisions, and that does itself increase in size in this way. The endosperm, also called the albumen, is formed in all Seeds; but in many it disappears, as it is used up in the growth of the embryo, e.g., in the Seed of an Apple, or of a Bean. Such Seeds are called "exalbuminous." In many Seeds a considerable, or even a large, albumen exists in the ripe Seed, with the embryo lying in it (*Polygonum*), or around it (*Lychnis*), or at the base (*Carex*), or on one side of it (*Grasses*). Besides the endosperm, another form of albumen, known as "perisperm," occurs in many plants. This is formed in the tissue of the nucleus, outside the embryo-sac. Perisperm is less common than endosperm, but co-exists with the latter in the ripe Seeds of a few plants (*Nymphaea*), and occasionally replaces it (*Canna*). The albumen may contain starch, oil, cellulose, or other materials for nourishment of the young plant; and its texture varies accordingly. The presence and nature of the albumen afford important characteristics of Natural Orders. Under **Ovule**, it was pointed out that the form of the ovule might remain orthotropous, or might become campylotropous or anatropous. The ripe Seeds show corresponding differences in form.

Seeds generally possess two coats, the outer called "testa," and the inner "tegmen." The latter is usually thin and membranous. The testa is very often thick and hard, e.g. in Brazil Nuts. It often bears outgrowths in the form of warts or ridges, hairs (Cotton), or wings, which are sometimes of large size (*Pinus*, *Bignonia*). All these outgrowths bear reference to the modes of distribution of Seeds, fitting them to adhere to the bodies of birds or quadrupeds, or to be distributed by wind. Occasionally, the testa has an outer layer of cells, which become mucilaginous on contact with water, and cause Seeds, when moist, to adhere to the bodies of animals. On the outer surface of the testa is the hilum, or scar, indicating the point of attachment of the Seed to its stalk. Many Seeds possess what resembles a third coat when ripe. In some, this coat, the "arillus," grows up from the placenta around the Seed; in others, it grows from the micropyle downwards, and it is then distinguished as the "arillode." An outgrowth is often seen in anatropous ovules (e.g., in Violets) over the funiculus (the adherent stalk); it is called a "caruncle." This third coat, whether arillus, arillode, or caruncle, in some Seeds is fleshy (e.g., mace of Nutmeg), serving as an inducement to animals to swallow the Seeds, and thus to secure wide distribution in their excrements; in others, it forms a tuft of hairs, and serves as a float for the Seed. In size and form, Seeds vary greatly in different plants, from the minute, dust-like Seeds of Orchids to the large Seed of the Cocoa-nut. The number produced by different plants is also very variable; but into these and similar matters it is not possible to enter here.

**SEED-BEDS.** A term applied to narrow strips of land prepared for the raising of seedling plants that are intended for transplanting into their permanent quarters, instead of being sown and allowed to grow there from the first. In all cases it is advisable to select a position for Seed-beds where the soil is friable and in good working order, and to render the surface smooth and fine before scattering the seeds over it. It is an easy matter to mark off any requisite width, according to the quantity of seed to be sown.

**SEED-SOWING.** See **Propagation.**

**SEEMANNIA** (named after Berthold Seemann, 1825-1871, a botanist and traveller). ORD. *Gesneraceae*. A monotypic genus. The species is a strigos-pubescent, stove, perennial herb, with a creeping rhizome, closely allied to *Achimenes* and *Isotoma*. For culture, see *Gesnera*.

**Seemannia—continued.**

**S. Benaryi** (Benary's). A synonym of *S. silvatica*.

**S. silvatica** (sylvan). *fl.* of a bright scarlet, on solitary, axillary pedicels; calyx with an adnate tube and five narrow lobes; corolla tube shortly gibbous at base, the limb of very short, erecto-patent lobes; stamens affixed to the base of the corolla. Winter.  $\bar{L}$  three or four in a whorl, very shortly petiolate, often caescent beneath; upper ones gradually reduced to bracts. *h.* 3ft. to 4ft. *Pern.* *Syns.* *S. Benaryi* (R. G. 814), *S. ternifolia* (R. G. 126).

**S. ternifolia** (ternate-leaved). A synonym of *S. silvatica*.

**SEGMENT.** One of the divisions into which a leaf or other flat organ may be cut.

**SEGO.** A common name for *Calochortus Nuttallii*.

**SEGREGATE.** Separated. The reverse of Aggregate.

**SELAGINÆÆ.** A natural order of shrubs, under-shrubs, or annual or perennial herbs, inhabiting extra-tropical regions, Australia excepted. Flowers white, blue, or rarely yellow, rather small, hermaphrodite, irregular, bracteate, ebracteolate, in dense, globose, oblong, or elongated, terminal or very rarely axillary spikes; calyx five-cleft or five-parted, or, owing to some of the parts being connate or deficient, three-parted, two-parted, or spathaceous; corolla gamopetalous, shortly or slenderly tubular at base; limb four or five-lobed, one or two-lipped, or sub-regular, spreading; stamens four, didynamous, or two. Fruit small, indehiscent. Leaves alternate, or the lower ones rarely opposite or radical, entire or toothed. The order comprises eight genera and about 140 species. Examples: *Globularia*, *Hebenstretia*, *Selago*.

**SELAGINELLA** (diminutive of *Selago*, the old name for another Lycopod). ORD. *Lycopodiaceae*. A vast genus (upwards of 300 species) of stove, greenhouses, or hardy, evergreen plants, much resembling Mosses. "The genus is concentrated in the tropical zone, and has its headquarters in tropical America. Only two species extend their range into Europe; and the Selaginellas of the Cape, temperate Australia, and South temperate America, are neither numerous nor remarkable. Habit entirely of *Lycopodium*, from which it differs by its dimorphic spores and sporangia, some of the species, small and fugacious, resembling *Hepaticæ*, with not more than two vascular bundles on the main stems. Stems copiously branched, the ultimate branching usually flabellate-dichotomous, trailing, sub-erect, sarmentose, or scandent, with the root-fibres confined to the base, or in the trailing species extended to the upper nodes; in shape more or less distinctly quadrangular, the faces angled (stems goniotropous, Spring) or the faces flat (stems pleurotropic, Spring); nodes sometimes distinctly articulated. Leaves small, furnished only with a single central vein, usually tetrastichous and dimorphous, and more or less oblique, the two rows of the lower plane larger and more spreading, the two rows of the upper ascending, adpressed to the stem and imbricated; in the sub-genus *Enselaginella* multifarious, or, if tetrastichous, all alike. Spikes usually tetrastichous and often sharply square, but in two sub-genera dimorphic on the same plan as the leaves, but mostly resupinate (i.e., the small bracts on the same plane as the large leaves, and *vice versa*)" (J. G. Baker, to whose admirable monograph of *Selaginella*, in the "Journal of Botany," 1883-5, we are indebted for the appended descriptions of the species best known to cultivation in this country). Selaginellas grow freely in any light soil, which should be kept open by intermixing charcoal, or small potsberds, through it. They require to be kept quite moist at all times, and prefer shade. Propagated readily from cuttings, made from the creeping stems, which emit roots at nearly every joint. *S. Kraussiana* is the well-known Lycopod so useful for edgings to greenhouse beds, and for decorative purposes in pots. This may be propagated in quantity at any season. Cuttings for preserving a collection of the

**Selaginella**—continued.

species should be inserted, about February or March, in the pots or pans in which they are to remain for the season. Both stove and greenhouse *Selaginellas* succeed under somewhat similar conditions respectively to stove and greenhouse Ferns.

**S. affinis** (related). *Stems* 1ft. or more long, trailing, flat on the back, bisulcate on the face, jointed at the nodes, forked low down and copiously pinnate, with erecto-patent, copiously compound branches. *l.* of the lower plane obtuse on the branchlets, ascending, oblong-lanceolate, acute,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, bright green; leaves of the upper plane one-third as long, oblique-oblong, cuspidate, imbricated. *spikes*  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts ovate, cuspidate, strongly keeled. Guiana. A rare, stove species. SYN. *S. rigida* (of gardens).

**S. africana** (African). A synonym of *S. Vogelii*.

**S. albo-nitens** (shining-white).\* *Stems* slender, trailing, copiously pinnate, the upper branches simple, the lower slightly compound. *l.* of the lower plane spaced on the main stem, spreading, oblong-lanceolate, one line long, bright green, rather unequal-sided, rounded on the upper side at the base, shortly ciliated; leaves of the upper plane one-third as long, oblique-ovate, distinctly cuspidate. *spikes*  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts acute, very crowded, strongly keeled. West Indies. Greenhouse.

**S. amoena** (pleasing). A variety of *S. caulescens*.

**S. apoda** (footless). A garden name for *S. apus*.

**S. apus** (footless).\* *Stems* slender, trailing, densely matted,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, the short, distant, erecto-patent branches simple or forked. *l.* of the lower plane spaced below the tips of the branches, the upper spreading, the lower reflexed, ovate, acute, half a line long, unequal-sided; leaves of the upper plane half as long, shortly cuspidate. *spikes*  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts ovate, acute, about one line long, strongly serrulated. Canada, &c. Greenhouse. SYNS. *S. apoda* and *S. densa* (of gardens).

**S. argentea** (silvery), of Spring. A variety of *S. caulescens*. The name *argentea* is also used in trade catalogues for *S. erythropus*.

**S. ascendens** (ascending). A form of *S. Martensii*.

**S. atroviridis** (dark green).\* *Stems* sub-erect,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, flat on the back, the root-fibres confined to the lower part, decompound, the branching between pinnatifid and pinnate. *l.* of the lower plane close, both on the stem and branches, spreading or rather ascending, oblong-rhomboid, sub-obtuse,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, bright green, unequal-sided, obscurely or distinctly ciliated; leaves of the upper plane half as long, oblong, long-cuspidate, much imbricated. *spikes* square,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts ovate, acute, strongly keeled. Madras, &c. Stove.

**S. azorica** (Azores). *Stems* trailing, rooting nearly to the tip,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, with several short, compound branches. *l.* of the lower plane contiguous on the branches, oblique-oblong, nearly equilateral, acute,  $\frac{1}{2}$  in. long, rounded at the base, serrulated from base to apex along both branches, bright green; leaves of the upper plane much imbricated, more than half as long as the others, oblique, oblong-lanceolate. Azores. Greenhouse.

**S. bellula** (rather pretty), of Moore. A synonym of *S. inaequalifolia perelegans*.

**S. brasiliensis** (Brazilian). *Stems* trailing,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, copiously pinnate, the branches erecto-patent, the upper simple, the lower slightly decompound. *l.* of the lower plane spaced and spreading, except towards the tips of the branches, nearly or quite one line long, bright green, cordate at base on the upper side, distinctly ciliated and imbricated over the stem; leaves of the upper plane half as long, distinctly cuspidate. *spikes*  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts ovate-lanceolate, strongly keeled. Brazil. Greenhouse. A near ally of *S. apus*.

**S. Braunii** (Braun's). *Stems* 1ft. to 1½ ft. long, erect, pale straw-colour, simple in the lower half, decompound, deltoid, and flexuous in the upper half; pinnæ erecto-patent, deltoid; pinnules regular, short, deltoid, spaced; ultimate branchlets  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long. *l.* of the lower plane contiguous only on the final branchlets, nearly spreading, ovate-rhomboid, half a line long; leaves of the upper plane one-third to half as long, shortly cuspidate. *spikes* short, square; bracts little longer than the sporangia. West China. A distinctly-marked and well-known, greenhouse species.

**S. Brownii** (Brown's). A form of *S. Kraussiana*.

**S. cæsia** (grey). A garden synonym of *S. uncinata*.

**S. c. arborea** (tree-like). A synonym of *S. Willdenovii*.

**S. canaliculata** (channelled).\* *Stems* sub-erect, sarmentose, 3ft. to 4ft. long; pinnæ deltoid, usually  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, sometimes flexuous and more elongated; lower branchlets copiously compound, the tertiary divisions more erecto-patent, and not so close as in *S. inaequalifolia*. *l.* of the lower plane crowded, oblong-rhomboid,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long on the branchlets, bright green, cuneate-truncate on the upper, nearly square on the lower, side at the base; leaves of the upper plane half as long, ovate-lanceolate. *spikes* square,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts cuspidate, strongly keeled. Eastern Himalayas, &c. Stove. Rare in cultivation. SYNS. *S. caudata*, *S. chinensis*, *S. sinensis* (of gardens).

**Selaginella**—continued.

**S. c. robusta** (robust). A very tall, strong-growing garden form SYN. *S. robusta* (of gardens).

**S. caudata** (tailed). A synonym of *S. canaliculata*.

**S. caulescens** (stemmed).\* *Stems* generally  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, stiffly erect, unbranched in the lower half, with spaced, adpressed leaves, deltoid and decompound in the upper half; pinnæ close, deltoid, with copiously sub-flabellately compound lower pinnules, the final branchlets ascending. *l.* of the lower plane crowded, ovate, falcate, acute, half a line to one line long, bright green, slightly ciliated on the upper side at base; leaves of the upper plane a quarter to one-third as long, much imbricated. *spikes* square,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts ovate, cuspidate. Japan, China, &c. Stove.

**S. c. amoena** (pleasing). *Stems* erect, about 1ft. high; upper part triangular, pinnately branched, with spreading, distant, acuminate leaves; branches horizontal, bipinnate. Mexico. Whole plant of a bright and cheerful green.

**S. c. argentea** (silvery). This only differs from the type in the silvery sheen of its under surface. SYN. *S. argentea* (of gardens).

**S. c. japonica** (Japanese). *Stems*, pinnæ less crowded, and not so decompound as in the type. *l.* of the lower plane broadly ovate; those of the main stem and pinnæ nearly as broad as long; those of the unbranched part of the stem rather spreading. Japan.

**S. chinensis** (Chinese). A garden name for *S. canaliculata*.

**S. cognata** (related). A synonym of *S. Lobbiai*.

**S. conferta** (clustered). *Stems* very slender, trailing, intermatted,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, copiously pinnate, the lower branches slightly compound. *l.* of the lower plane close, erecto-patent, linear-oblong, obtuse, half a line long, equal-sided, strongly ciliated, a little imbricated; leaves of the upper plane one-third or one-fourth as long, acute. *spikes* very short; bracts ovate, crowded, strongly keeled. Cuba. Stove.

**S. convoluta** (convolute). *Stems* densely tufted,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, compound nearly to the base, the primary branching pinnate, the short, broad, erecto-patent pinnæ between pinnate and flabellate. *l.* of the lower plane much imbricated, ascending, ovate, acute, half a line long, serrulated, bright green; leaves of the upper plane half as long, acute. *spikes* square,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts cuspidate, strongly keeled. Tropical America. Stove.

**S. cuspidata** (cuspidate).\* *Stems* densely tufted, about  $\frac{1}{2}$  in. long, branched nearly or quite from the base, the primary branching pinnate; pinnæ short, rhomboid, copiously compound, with contiguous branchlets. *l.* of the lower plane crowded, ascending, oblique-ovate, cuspidate, dilated and ciliated on the upper side at base, pale green, white-edged, half a line to one line long; leaves of the upper plane nearly as long, cuspidate. *spikes* square,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts cuspidate, strongly keeled. Mexico, &c. A common, stove species.

**S. c. elongata** (elongated). *Stems* 1ft. or more long, simple in the lower part, the primary branches more elongated and more pinnate. SYN. *Lycopodium cordifolium* (of gardens).

**S. delicatissima** (very delicate). *Stems* densely matted, very slender, stramineous, trailing to a length of  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in., forked and copiously pinnately branched, the branches copiously compound. *l.* of the lower plane spaced, except at the tips of the branches, spreading, oblong, obtuse, broadly rounded and densely ciliated on the upper side at base; leaves of the upper plane half as long, acute, strongly auricled on the outside at base. *spikes* unknown. Probably Andine. Greenhouse. The leaves and branches curl up readily in drought.

**S. densa** (dense). A garden name for *S. apus*.

**S. denticulata** (small-toothed).\* *Stems* densely matted, pale, trailing,  $\frac{1}{2}$  in. long, copiously pinnately branched, the lower branches copiously flabellately compound. *l.* of the lower plane close or slightly spaced, broadly ovate, oblique, sub-acute, three-quarters of a line to one line long, spreading or erecto-patent, flat, denticulate, cordate on the upper side at base, much imbricated over the stem; leaves of the upper plane half as long, cuspidate, rather diverging. *spikes* sessile, square, about  $\frac{1}{2}$  in. long; bracts acute, much imbricated, strongly keeled. Mediterranean region. Greenhouse. In exposed places, the whole plant sometimes turns bright red when old.

**S. dichroa** (two-coloured). A garden form of *S. Vogelii*.

**S. distorta** (distorted). *Stems* slender, trailing or sub-erect, intermatted,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, obscurely jointed at the nodes, copiously pinnate, the short, ascending branches sub-flabellately compound. *l.* of the lower plane crowded on the branchlets, deflexed, oblong-lanceolate, acute, about half a line long; leaves of the upper plane more than half as long, imbricated, oblong, acute. *spikes* short, square; bracts acute, strongly keeled. Brazil. Greenhouse.

**S. d. major** (larger). More luxuriant, with stouter stems, 1ft. or more in length, and often excurrent at the end; leaves of the lower plane often one line long, spreading, or rather ascending.

**S. divaricata** (divaricate). A form of *S. Martensii*.

**Selaginella**—continued.

**S. erythropus** (red-footed).\* *stems* about 9 in. long, bright crimson, simple in the lower half or third, deltoid and decompound upwards; lower pinnae deltoid, tripinnate; final branchlets ascending, contiguous. *l.* of the lower plane contiguous, ascending, oblong or ovate-lanceolate, acute,  $\frac{1}{2}$  in. to  $\frac{1}{16}$  in. long, bright green, unequal-sided, strongly ciliated and imbricated over the stem on the upper side at the base; leaves of the upper plane half as long, oblique-ovate, cuspidate. *spikes* square; bracts cuspidate, strongly keeled. Tropical America. Stove. The form *major* is more compound, the unbranched part of the stem longer, and all its leaves adpressed. *S. setosa* (of gardens) is a starved, small form of this species.

**S. filicina** (Fern-like). A synonym of *S. hematodes*.

**S. flabellata** (fan-shaped). *stems* 1 ft. to 2 ft. long, erect, simple in the lower half, deltoid and decompound in the upper half;

**Selaginella**—continued.

**S. flagelliformis** (whip-like). A synonym of *S. plumosa flagellifera*.

**S. flexuosa** (flexuous). *stems* about 1 ft. long, flat on the back, copiously branched, the lower branches elongated and copiously compound, the upper part assurgent; root-fibres often only developed from the lower half. *l.* of the lower plane close, spreading, bright green, oblong-rhomboidal, sub-acute,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, more produced on the upper side of the distinct midrib, serrulated on the upper side near the base; leaves of the upper plane one-third as long, long-cuspidate. *spikes*  $\frac{1}{2}$  in. to 1 in. long, square; bracts half a line long, crowded, sharply keeled. South Brazil. Stove.

**S. formosa** (beautiful). A form of *S. Martensii*.

**S. fulcrata** (fulcrate). *stems* 1 ft. to 2 ft. long, stiffly erect, simple in the lower half, with a few distant, small, adpressed leaves, deltoid and decompound in the upper half; pinnae deltoid.

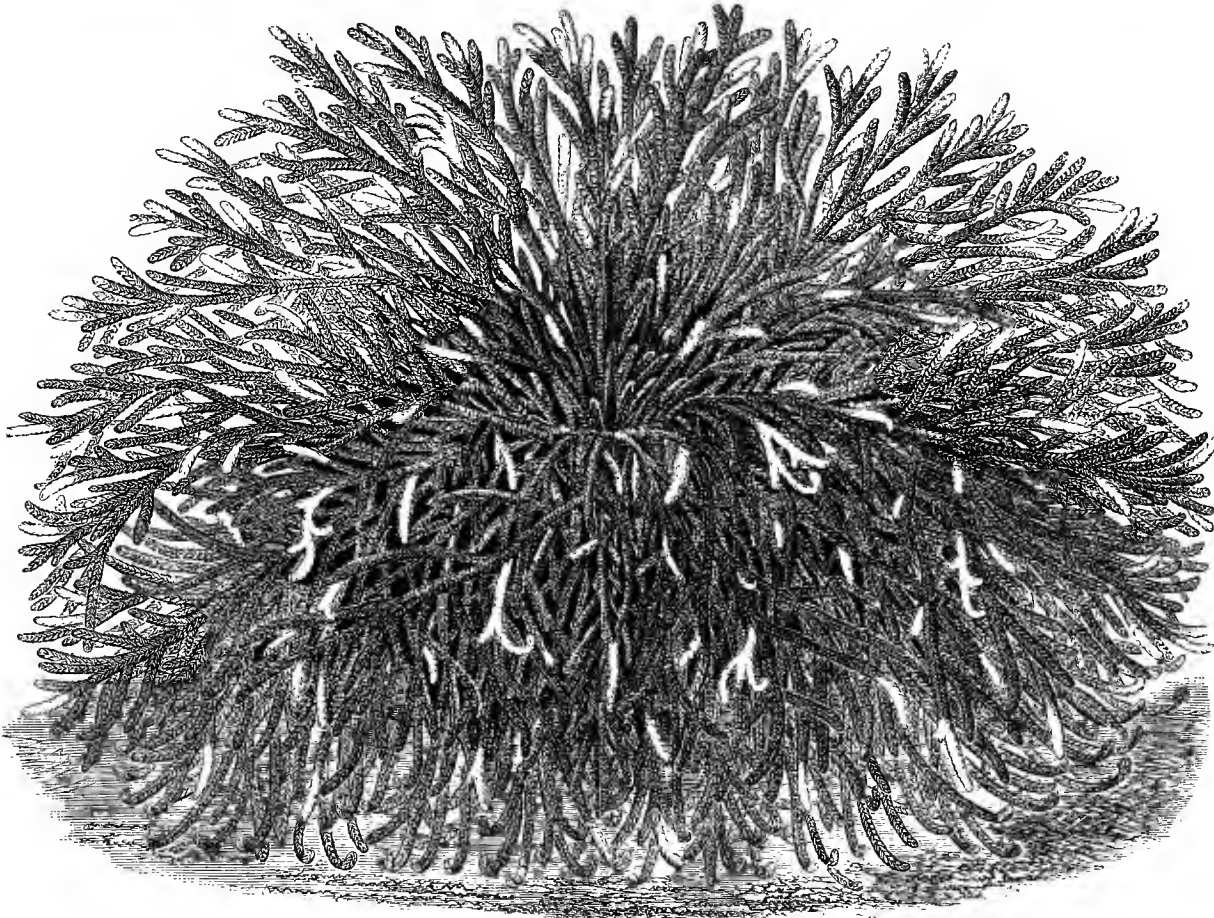


FIG. 469. SELAGINELLA INVOLVENS VARIEGATA.

pinnae deltoid, the lower three or four-pinnate; final branchlets contiguous,  $\frac{1}{2}$  in. to 1 in. long. *l.* of the lower plane contiguous, oblique-ovate, acute, ascending, bright green, obliquely inserted, much dilated, ciliated, much imbricated over the stem on the upper side at base; leaves of the upper plane a quarter to one-third as long, cuspidate. *spikes* square,  $\frac{1}{2}$  in. to 1 in. long; bracts cuspidate, strongly keeled. Tropics of Asia, America, and Polynesia. Stove.

**S. flagellata** (whip-like). *stems* trailing, 6 in. long; branches erecto-patent, the lower ones copiously compound; branches excurrent and whip-like at the end. *l.* of the lower plane ovate-lanceolate, very acute, above one line long, pellucid, bright green, more produced on the upper side of the midrib, rounded at the base, shortly ciliated, imbricated over the stem; leaves of the upper plane one-third as long, ovate, acuminate, falcate, converging. *spikes*  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts very acuminate, strongly keeled. French Guiana. Stove.

**S. flagellifera** (whip-bearing). A garden form of *S. plumosa*.

the lower ones three or four-pinnate, the rachises pubescent; final branchlets contiguous,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long. *l.* of the lower plane rather spaced even on the branchlets, ascending, lanceolate, acute,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, truncate; leaves of the upper plane half as long, incurved, not cuspidate. *spikes* square,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts little longer than the sporangia. Eastern Himalayas. A well-marked, greenhouse species.

**S. Galeottii** (Galeotti's). *stems* 1 ft. to 2 ft. long, sub-erect, with root-fibres from the lower half, sometimes excurrent and whip-like at the tip, copiously pinnate, the branches pyramidal and decompound. *l.* of the lower plane close on the branchlets, spaced on the branches and stem, ascending, lanceolate or oblong-lanceolate, acute,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, more produced on the upper side of the midrib, broadly rounded and shortly ciliated on the upper side at the base, truncate and shortly ciliated on the lower; leaves of the upper plane one-third to one-half as long, much imbricated. *spikes*  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts cuspidate, strongly keeled. Mexico. Stove.

**Selaginella**—continued.

**S. grandis** (great).\* *stems* erect, 1 ft. to 2 ft. long, simple in the lower half, deltoid and decoupled in the upper half, the branching midway between flabellate and pinnate, the contiguous final branchlets  $\frac{1}{2}$  in. broad. *l.* of the lower plane crowded, lanceolate, very acute,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, bright green, equilateral except at the base, slightly ciliated; leaves of the upper plane one-third as long, ovate-lanceolate, very acute, much imbricated. *spikes* copious, square, tetragonal,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts strongly ciliated. Borneo, 1882. A very fine, stove plant. (G. C. n. s., xviii. p. 40.) SYN. *S. platyphylla* (of gardens).

**S. hematodes** (bloody).\* *stems* 1 ft. to 2 ft. long, bright crimson, unbranched in the lower half, with leaves much spaced and adpressed, deltoid and decoupled in the upper half; pinnate deltoid, three or four-pinnate, the contiguous, erecto-patent ultimate divisions  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long. *l.* of the lower plane contiguous, ascending, ovate or oblong-rhomboidal, acute,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, bright green, dilated on the upper side at the base, broadly rounded; leaves of the upper plane minute, with a large cusp. *spikes* square,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts ovate-lanceolate. Andes. Stove. One of the handsomest species. SYN. *S. filicina*.

**S. helvetica** (Swiss). *stems* densely matted, slender, pale, trailing,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, forked at base, distantly pinnately branched, with short, erecto-patent, slightly compound branches. *l.* of the lower plane spreading, close or slightly spaced, half a line or more long, oblique, produced on the upper side; leaves of the upper plane acute, half as long, rather divergent. *spikes* distinctly pedunculate,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, terete; bracts imbricated. Central Europe to Japan. Hardy. (J. F. A. 196, under name of *Lycopodium helveticum*.)

**S. inaequalifolia** (unequal-leaved). *stems* sub-erect, sarmentose,  $\frac{1}{2}$  ft. to  $\frac{1}{4}$  ft. long; pinnate oblong-lanceolate,  $\frac{1}{2}$  in. long, the erecto-patent branchlets considerably compound, with ascending tertiary divisions. *l.* of the lower plane contiguous, oblong-rhomboid,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, bright green; leaves of the upper plane half as long, shortly cuspidate. *spikes* square,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts ovate, cuspidate, strongly keeled. Eastern Himalayas. A well-known, stove species.

**S. i. perelegans** (very elegant). *stems* not more than 1 ft. long; pinnate shorter, more deltoid, with more compound lower branches. *spikes* copious, often  $\frac{1}{2}$  in. long. SYN. *S. bellula* (of Moore) (G. C. n. s., xi. p. 173).

**S. involvens** (rolled up). *stems* very densely tufted,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, deltoid, twice or thrice pinnate, branched nearly or quite from the base, the branching of all grades between flabellate and pinnate. *l.* of the lower plane very crowded, ascending, ovate, with a distinct cusp, about one line long, bright green, very thick, serrulated, nearly equal-sided; leaves of the upper plane nearly as long, oblique, distinctly cuspidate. *spikes* square; bracts acutely keeled. Japan, China, &c. Greenhouse. (G. C. n. s., xix. p. 404.)

**S. i. texta** (woven). A peculiar garden form, in which the branches are almost simple. SYN. *S. texta* (of Belgian gardens).

**S. i. variegata** (variegated). This only differs from the type in having the tips of some of the branches creamy-white. See Fig. 469, for which we are indebted to Mr. Wm. Bnll.

**S. japonica** (Japanese). A variety of *S. caulescens*.

**S. Karsteniana** (Karsten's). *stems* about 1 ft. long, erect from a decumbent base, bisinuate down the face, copiously pinnate; branches short, erecto-patent, sparingly compound. *l.* of the lower plane ovate, acute, dark green, sub-diaphanous, very unequal-sided, denticulate on the upper margin, much produced on the upper side at base and imbricated over the stem; leaves of the upper plane one-third as long, ovate-oblong, cuspidate. *spikes* short, often twin, but little flattened; bracts not very obviously dimorphous. New Grenada. Greenhouse.

**S. Kraussiana** (Krauss).\* *stems* trailing,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, jointed at the nodes, copiously pinnate, with copiously compound, erecto-patent branches. *l.* of the lower plane contiguous on the branchlets, spaced on the branches and main stems, oblong-lanceolate, acute,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, bright green, ciliated and broadly rounded at base; leaves of the upper plane one-third as long, not cuspidate. *spikes* short, square; bracts cuspidate, strongly keeled. South Africa, 1878. Greenhouse. *S. Brownii* is a dwarf form from the Azores. The form *aurea* has yellow leaves; *variegata* is a variegated form.

**S. laevigata** (smooth).\* *stems* erect, 1 ft. to 1 ft. long, simple in the lower half, the leaves small, distant and soon deciduous, deltoid in the upper half, with petiolate, deltoid, once or twice pinnate pinnæ; final divisions erecto-patent,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long. *l.* of the lower plane crowded, oblong-lanceolate, sub-patent, very falcate, acute,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, bright green, adnate by a broad base, decurrent on the lower side; leaves of the upper plane minute, recurved. *spikes* square,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts acute, strongly keeled. Madagascar. Stove.

**S. i. Lyalli** (Lyall's). *stems*, lower pinnæ bipinnate, with final divisions  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long. A more compound variety.

**S. lepidophylla** (scaly-leaved).\* The Resurrection Club-moss, which is frequently exposed for sale as a vegetable curiosity, owing to the manner in which its curled-up stems unroll and resume a fresh appearance when placed in water. *stems* densely tufted,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, branched to the base, the primary branching closely pinnate, the broad, cuneate, ascending

**Selaginella**—continued.

pinnæ copiously sub-flabellately compound. *l.* of the lower plane much imbricated, ascending, oblique, ovate, obtuse, half a line long, minutely ciliated, when old tinted red-brown; leaves of the upper plane nearly as long, obtuse. *spikes* square,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts deltoid, acutely keeled. Texas to Peru. Greenhouse. (G. C. 1872, p. 69.)

**S. Lobbii** (Lobb's). *stems* sub-erect, sarmentose,  $\frac{1}{2}$  ft. to  $\frac{1}{4}$  ft. long; pinnæ regular, lanceolate-deltoid, about  $\frac{1}{2}$  in. long, cuneate at base; pinnules contiguous, erecto-patent, the upper ones simple, the lower forked. *l.* of the lower plane contiguous, oblong-lanceolate, falcate, acute,  $\frac{1}{2}$  in. long on the pinnules,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. on the pinnæ, bright green, truncate and rather dilated on both sides at base; leaves of the upper plane one-third as long, cuspidate. *spikes* square, oblique-ovate, terminal on the branchlets,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts cuspidate, strongly keeled. Borneo. Stove. Rare in cultivation. SYN. *S. cognata*.

**S. Ludoviciana** (Louisianian). *stems* slender, copiously pinnate, flat,  $\frac{1}{2}$  in. long, the upper branches simple, the lower slightly compound. *l.* of the lower plane much spaced below the tips of the branches, spreading, ovate-oblong, sub-acute, half a line or more long, serrulated, imbricated over the stem; leaves of the upper plane half as long, cuspidate. *spikes*  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts one line long, strongly keeled. United States. A well-known, greenhouse species, allied to *S. apus*.

**S. Lyalli** (Lyall's). A form of *S. laevigata*.

**S. Martensii** (Murtens).\* *stems*  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, trailing in the lower half, with copious, long root-fibres, ascending in the upper half, decoupled, the branching between pinnate and flabellate. *l.* of the lower plane usually crowded, erecto-patent, oblong-lanceolate, sub-obtuse, bright green, unequal-sided, serrulated, a little imbricated; leaves of the upper plane half as long, with a long cusp, much imbricated. *spikes*  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, square; bracts acute, strongly keeled. Mexico. A common, greenhouse species, with numerous varieties, of which the most distinct are: *ascendens*, *divaricata*, *formosa*, the variegated *robusta*, and *stolonifera*.

**S. molliceps** (soft-stemmed). *stems* erect, densely tufted,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, copiously pinnate, the base bisinuate; lower branches copiously compound. *l.* of the lower plane contiguous on the branchlets, spaced on the main stem, erecto-patent, obliquely oblong-lanceolate, acute, dark green, one line long, very unequal-sided, serrulated on the upper edge, broadly rounded, shortly ciliated, and a little imbricated over the stem on the upper side at base; leaves of the upper plane one-half to one-third as long, ovate or ovate-lanceolate, cuspidate. *spikes* copious, resupinate,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts of the upper plane lanceolate-rhomboid, those of the lower plane ovate, cuspidate. Upper Guinea. Stove. SYN. *S. rubricaulis*.

**S. mutabilis** (changeable). A synonym of *S. serpens*.

**S. patula** (spreading). *stems* slender, pale, trailing,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, with a long, whip-like tip, and numerous short, alternate, pinnately-arranged branches with three to seven branchlets. *l.* of the lower plane crowded, erecto-patent, oblong-lanceolate, bright green, the midrib distinct, ciliated and imbricated over the rachis on the upper side at the base; leaves of the upper plane one-third as long, oblique-ovate, acute. *spikes* square,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts cuspidate, much imbricated, strongly keeled. Jamaica. A common, greenhouse species.

**S. pilifera** (hair-bearing). *stems* densely tufted,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, copiously compound, cuneate, the branching midway between pinnate and flabellate, the branches erecto-patent. *l.* of the lower plane crowded on the branches, rather spaced on the main stem, ascending, oblique-ovate, half a line long, distinctly cuspidate. *spikes* square,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts strongly keeled. Texas. Greenhouse. A rare species in cultivation.

**S. platyphylla** (flat-leaved). A garden synonym of *S. grandis*.

**S. plumosa** (feathery). *stems* pale, trailing,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, often forked low down, copiously pinnately branched, the branches copiously compound, the root-fibres extending to the upper nodes. *l.* of the lower plane contiguous on the branches, spreading or rather ascending, bright green, oblong- or ovate-lanceolate, acute,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, ciliated at base, cordate on the upper side and much imbricated over the stem; leaves of the upper plane one-third as long, ovate, cuspidate, much imbricated. *spikes* copious, square,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts acute, strongly keeled. Eastern Himalayas. Stove. *S. flagellifera* is merely a garden form of this species. SYN. *S. flagelliformis*.

**S. Poeppigiana** (Poeppig's). *stems* trailing, 1 ft. to 2 ft. long, forked at base, jointed at the nodes, copiously pinnate, with copiously compound, erecto-patent branchlets. *l.* of the lower plane spaced, except towards the tips of the branchlets, much spaced on the main stem, ascending, oblong-lanceolate,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, broadly rounded on the upper side at base; leaves of the upper plane one-third as long, oblique, with a distinct cusp. *spikes* square,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts acute, sharply keeled. Andes. Greenhouse.

**S. Poulteri** (Poulter's).\* *stems* densely tufted, very slender, sub-erect,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, three or four times trichotomously-forked, with slender radicles from the lower half. *l.* of the lower plane distinctly spaced, spreading, sub-orbicular, obtuse, half a line long, bright green; leaves of the upper plane nearly as long, but acute, ascending. *spikes* slender,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; bracts scarcely longer than the sporangia. Azores, 1868. Greenhouse.

**Selaginella**—*continued*.

**S. rigida** (rigid). A garden name for *S. affinis*.

**S. robusta** (robust). A garden name for *S. canaliculata robusta*.

**S. rubella** (reddish). *stems* 1 ft. long, sub-erect, with root-fibres from the lower half, reddish-brown, pinnately branched, the lower branches cuneate, with five to seven branchlets. *l.* of the lower plane ascending, crowded on the branchlets, oblique-oblong, obtuse or obscurely cuspidate,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, dark green, turning reddish with age, more produced and ciliated on the upper side at the base; leaves of the upper plane half as long, ovate, cuspidate, much imbricated. *spikes* square,  $\frac{1}{2}$  in. to 1 in. long; bracts long-cuspidate, strongly keeled. Native country unknown, 1870. Greenhouse. (G. C. 1871, p. 902.)

**S. rubricaulis** (red-stemmed). A synonym of *S. molliceps*.

**S. selaginoides** (Fir Club-moss-like). A synonym of *S. spinosa*.

**S. serpens** (winding). *stems* densely matted, quite trailing,  $\frac{6}{10}$  to 9 in. long, copiously pinnate, branched, with numerous, erecto-patent, slightly compound branches. *l.* of the lower plane crowded, spreading, three-quarters of a line long, ovate-oblong, bright green with a distinct midrib, both sides rounded and ciliated at base; leaves of the upper plane one-third as long, acute. *spikes* square,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long; bracts cuspidate, crowded, strongly keeled. West Indies. A well-known, stove species. *SYNS. S. mutabilis, S. variabilis, S. varians.*

**S. setosa** (bristly). A garden form of *S. erythropus*.

**S. sinensis** (Chinese). A garden synonym of *S. canaliculata*.

**S. spinosa** (spiny). *barren stems* short, trailing, slender, little branched, with short, ascending branches. *l.* lax and spreading on the lower part of the barren branches, dense and ascending upwards, lanceolate, half a line to one line long, acute, bright green, ciliated. *fertile stems* erect, simple, 2 in. to 3 in. long, with a leafy peduncle about as long as the spike. *spike* multifarious; bracts lax, ascending, lanceolate or ovate-lanceolate,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, strongly ciliated, not acutely keeled. Europe (Britain), North America. Hardy. *SYN. S. selaginoides.*

**S. spinulosa** (small-spined). *stems* very slender, trailing, 1 in. to 2 in. long, little-branched. *l.* of the lower plane spaced even on the branchlets, oblong, obtuse, half a line long, pale green, strongly ciliated; leaves of the upper plane a quarter to one-third as long, oblong, acute. *spikes* short, square; bracts cuspidate, strongly keeled. Java. Stove.

**S. stolonifera** (stolon-bearing). A form of *S. Martensii*.

**S. suberosa** (slightly ero-se). *stems* densely tufted, sub-erect, often above 1 ft. long, pale, shining brown, copiously pinnate, the branching erecto-patent and decompound, the root-fibres sometimes extending half-way up to it. *l.* of the lower plane spaced and erecto-patent on the branches, very distant and spreading on the main stem, oblique-lanceolate or ovate-lanceolate, acute, bright green, unequal-sided, much produced, broadly rounded, shortly ciliated; leaves of the upper plane half as long, long-cuspidate. *spikes* copious,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, resupinate; bracts of the upper plane lanceolate, erecto-patent, of the lower plane ascending, ovate, cuspidate. Khasia Mountains. Greenhouse.

**S. sulcata** (furrowed). *stems* trailing in the lower half, usually assurgent in the upper half, deeply bisulcate down the face, jointed at the nodes, copiously flabellate-pinnate, the flial branchlets contiguous. *l.* of the lower plane close on the branchlets, spaced on the stem, oblong-lanceolate, acute,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, auricled on both sides at base; leaves of the upper plane one-third as long, long-cuspidate. *spikes*  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, square; bracts acute, strongly keeled. South Brazil. Greenhouse.

**S. texta**. See *S. involvens texta*.

**S. uncinata** (hooked).\* *stems* weak, slender, pale straw-coloured, bisulcate on the face, trailing, 1 ft. to 2 ft. long, with a long, excurrent tip, and alternate, short, pinnately arranged, copiously compound branches. *l.* of the lower plane sub-ovate,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, close or rather spaced on the branches, thin, bright blue-green, minutely petiolate, both sides cordate at base; leaves of the upper plane one-third as long, cuspidate, much imbricated. *spikes*  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, square; bracts one line long, crowded, sharply keeled. China. A well-known, greenhouse species. This is the proper name of the blue-tinted plant known in gardens as *S. cesia*.

**S. variabilis** (variable). A synonym of *S. serpens*.

**S. varians** (variable). A synonym of *S. serpens*.

**S. Victorise** (Victoria's). *stems* sub-erect, sarmentose, 3 ft. to 4 ft. long; pinnae lanceolate-deltoid, 6 in. to 9 in. long, caudate; upper pinnales erecto-patent and simple, contiguous, the lower forked or slightly pinnate. *l.* of the lower plane crowded, oblong-lanceolate, falcate, acute, one line long, dark bright green, obscurely petiolate; leaves of the upper plane a quarter as long, much imbricated. *spikes* square, 1 in. to 2 in. long; bracts acutely keeled. Borneo, &c., 1879. Stove. Rare in cultivation. (G. C. n. s., xi, p. 75.)

**S. viticulosa** (tendrilled). *stems* about 9 in. long, stramineous, simple in the lower part, deltoid and decompound upwards; pinnae deltoid, bi- or tri-pinnate, the root-fibres sometimes extending to the axils of the lowest pinnae, the contiguous, ascending final segments  $\frac{1}{2}$  in. to 1 in. long. *l.* of the lower plane contiguous, ascending, lanceolate or oblique-ovate, acute,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, bright green; leaves of the upper plane one-third

**Selaginella**—*continued*.

as long, oblique-ovate, cuspidate. *spikes* square; bracts cuspidate, strongly keeled. Central America and Venezuela. Stove.

**S. Vogelii** (Vogel's). *stems* 1 ft. to 2 ft. long, erect, simple in the lower half, often pink-tinted, with a few distant, small, adpressed leaves, deltoid and decompound in the upper half; lower pinnae deltoid, petiolate, three or four-pinnate, the contiguous, erecto-patent final divisions  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. *l.* of the lower plane spaced even on the branchlets, lanceolate or oblong-lanceolate, ascending, acute, one to two lines long, bright green, both edges liable to be revolute, truncate at base; leaves of the upper plane minute, with a large cusp. *spikes* square,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long; bracts cuspidate, strongly keeled. West Africa. Stove. Well known in cultivation. *SYN. S. africana*. There is a variegated form. *S. dichrous* is a garden form of this species.

**S. Wallichii** (Wallich's).\* *stems* sarmentose, sub-erect, 2 ft. to 3 ft. long; pinnae lanceolate, 6 in. to 9 in. long; pinnales invariably simple, crowded, erecto-patent, 1 in. to 1  $\frac{1}{2}$  in. long, the end one sometimes 3 in. to 4 in. long. *l.* of the lower plane crowded, oblong-lanceolate, slightly falcate, pointed at the upper corner, equal-sided, the lower ones of the pinnales  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, the upper gradually smaller, dark bright green, obscurely petiolate, truncate or slightly cordate on both sides at the base; leaves of the upper plane a quarter as long, much imbricated. *spikes* square, terminal on the pinnales,  $\frac{1}{2}$  in. to 1 in. long; bracts cuspidate, strongly keeled. India. A common and ornamental, stove species.

**S. Willdenovii** (Willdenow's).\* *stems* climbing to a length of 12 ft. to 20 ft. or more; pinnae spreading, deltoid, 1 ft. to 2 ft. long, pinnales deltoid and decompound; ultimate branches short and contiguous. *l.* of the lower plane crowded, ascending, ovate or oblong,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, green with a tint of blue, obscurely petiolate, cordate on both sides at base; leaves of the upper plane one-third as long, not cuspidate. *spikes* square,  $\frac{1}{2}$  in. to 1 in. long; bracts scarcely larger than the sporangia. Cochinchina, &c. A well-known, stove species. *SYN. S. cesia arborea*.

**SELAGO** (the old Latin name, used by Pliny, for a plant which the Druids gathered with mysterious ceremonies). *ORD. Selaginæ*. A genus comprising nearly eighty species of greenhouse shrubs or under-shrubs, often Heath-like, rarely dwarf, annual herbs; one is a native of Madagascar, another is found in tropical Africa, and the rest are extra-tropical South African. Flowers in the axils of the ovate or narrow bracts, or rarely shortly pedicellate with a bract, in terminal spikes; calyx two, three, or five-cleft; corolla limb oblique or sub-bilabiate; stamens four, didynamous. Leaves narrow or rather small, sometimes very small, alternate, scattered, or the lower ones rarely opposite; often fascicled in the axils, entire or toothed. A selection of species, including those best known in gardens, is given below. They are of easy culture in sandy loam or peat and sand. Propagation may be effected by seeds; or by cuttings of half-ripened wood, inserted in sandy soil, under a bell glass, in bottom heat. All are South African sub-shrubs, flowering in summer.

**S. corymbosa** (corymböse). *fl.* white, corymböse; corolla tube scarcely exceeding the calyx; bracts ovate-linear. *l.* linear, fascicled. Stem erect, branched, pubescent. *h.* 2 ft. 1699.

**S. c. polystachya** (many-spiked). *fl.* loosely paniculate-spiked or thyrsoid; corolla larger. *l.* acute, flat. *h.* 9 in. 1823.

**S. distans** (distant). *fl.* white; calyx segments acuminate, shorter than the corolla tube; spikes solitary, terminal, scattered-flowered; bracts oblong. *l.* fascicled, two to three lines long, slightly incurved, semiterete, obtuse. Stems sub-dichotomously branched; branchlets pubescent. *h.* 1 ft. 1845. See Fig. 470. (B. R. xxxi. 46.)

**S. fasciculata** (fascicled). A synonym of *S. serrata*.

**S. fruticosa** (shrubby). *fl.* yellow, in pedunculate heads, spikes, or panicles; corolla scarcely exceeding the calyx. *l.* linear, slightly obtuse, glabrous, slightly spreading or the lower ones reflexed, solitary or sub-fasciculate, the margins revolute. *h.* 1 ft. 1774.



FIG. 470. FLOWERING BRANCH OF SELAGO DISTANS.



**Selago**—continued.

**S. Gillii** (Gill's).\* *fl.* pink; corolla tubular; spikelets terminal, lin. to 3in. long, or the panicle shortened and loosely few-flowered. *l.* clustered; whitish, glabrous, elliptic-lanceolate or the lower ones ovate, three to six lines long. Stem branched. *h.* 6in. 1829. (B. M. 3028; B. R. 1504.)

**S. rapunculoides** (Rampion-like). A synonym of *S. spuria*.

**S. rotundifolia** (round-leaved). *fl.* purple; corolla tube filiform, three or four times longer than the calyx; spikelets terminal, straight, pedunculate, scarcely lin. long. *l.* obovate-elliptic, glabrous, entire, clustered-fasciculate. Stem straight, terete. *h.* 1ft. 1814.

**S. serrata** (toothed). *fl.* blue, disposed in long spikes or fascicled corymbs; corolla tube filiform, elongated; bracts linear-subulate. *l.* obovate-elliptic, acute, serrated, decurrent, often glabrous. Stems straight, leafy. *h.* 1ft. 1774. SYN. *S. fasciculata* (B. R. 184; L. B. C. 1423).

**S. spuria** (spurious). *fl.* violet; corolla tube filiform, very long; spikes short, terminal. *l.* linear-elongated, acute, toothed, the upper ones shorter and entire. Stem nearly simple, erect. *h.* 2ft. 1824. SYN. *S. rapunculoides*.

**SELANDRIA CERASI.** A name formerly given in England to the Sawfly now known as *Eriocampa limacina*, the parent of the dreaded Slugworm, frequently so destructive to most kinds of fruit-trees, *e.g.*, Cherry, Pear, and many others, as well as to several forest-trees, *e.g.*, Oak and Birch. See **Slugworms**.

**SELATIUM.** A synonym of *Gentiana*.

**SELENIA** (probably from *selene*, the moon; connection not obvious). ORD. *Cruciferae*. A small genus (two species) of small, hardy, annual herbs, natives of Texas and Arkansas. Flowers yellowish, in terminal, leafy racemes; sepals spreading, coloured, sub-equal; petals erect. Leaves pinnatisect. *S. aurea*, whether for the colour or odour of its flowers, or for the considerable time it remains in blossom, is well worthy of cultivation. It requires similar treatment to other hardy annuals.

**S. aurea** (golden).\* *fl.* erect, the lower ones solitary in the upper axils, the upper ones collected into a sub-corymbose raceme; sepals greenish-yellow; petals golden-yellow, twice as long as the sepals, obovate-spathulate. June. *l.* lin. to 2in. long,  $\frac{1}{2}$ in. to  $\frac{3}{4}$ in. broad, linear-oblong, pinnatifid; segments about five to seven pairs. *h.* 9in. 1881. (B. M. 6607.)

**SELENIPEDIUM** (from *selenis*, a little crescent, and *pedion* or *podion*, a slipper; in allusion to the crescentic, slipper-shaped labellum). South American Lady's Slipper. Including *Uropedium*. ORD. *Orchideae*. A genus comprising about a dozen species of stove, terrestrial orchids, differing from *Cypripedium* in having a three-celled and three-furrowed or three-lobed ovary; they inhabit the mountainous parts of South America. Flowers showy or rarely mediocre, pedicellate; sepals spreading; petals free; lip sessile, spreading, inflated like a slipper; peduncles many-flowered. Stem erect, leafy. Regarding *S. Schlumii*, Mr. B. S. Williams remarks (in the "Orchid Grower's Manual"): "This is a difficult plant to cultivate. The imported plants appear as if they had been growing beside streams of water which are subjected to being flooded, for the leaves are frequently coated to a great extent with deposited mud; and it would, therefore, appear that our difficulties with this plant have arisen chiefly from an insufficient supply of water. We pot in peat, adding a little turfy loam and sand, with good drainage, and take care that water does not lodge in the heart of the plant. It is best grown at the cool end of the Cattleya house." For general culture, see *Cypripedium* (under which the species were formerly included).

**S. Ainsworthii** (Ainsworth's).\* *fl.*, upper sepal whitish or yellowish-green, bordered with pale purple, the lower one very wide, ventricose; petals rather broad, purple, with a green mid-vein and a pallid area near the base; side laciniae of lip reflexed, pale sulphur-yellow, copiously spotted inside at base; staminode purple-colour, with a dark purple, hairy border outside. 1878. A hybrid between *S. Sedeni* and *S. Roezlii*.

**S. albo-purpureum** (white-and-purple). *fl.* much larger than in *S. Sedeni*; dorsal sepal having a pinkish tinge on the margin, elongated-ovate; petals pinkish, 5in. to 6in. long, twisted,

**Selenipedium**—continued.

hanging down beyond the lip; pouch of the lip dull crimson-red, the inflexed edges at its base ivory-white, bordered with pink, and nearly covered by rosy spots. *l.* long, green, linear-lanceolate. A handsome garden hybrid between *S. Dominicanum* and *S. Schlumii*. SYN. *Cypripedium albo-purpureum* (Ga. xxi. 332).

**S. calurum** (beautiful-tailed).\* *fl.* large and showy, freely produced; dorsal sepal pale green, longitudinally ribbed with purple; petals pale green, edged with rose-red near the base, wholly bright rose-red at apex, 2 $\frac{1}{2}$ in. long, narrower and more twisted than in *S. Sedeni*; lip of a deep wine-crimson outside, very handsome. *l.* elongated, channelled, acute, green, in a thick tuft. Stems tall, branched, brownish-red. A handsome, free-flowering hybrid between *S. longifolium* and *S. Sedeni*. SYN. *Cypripedium calurum* (F. & P. 1884, 145; W. O. A. iii. 136).



FIG. 471. INFLORESCENCE OF SELENIPEDIUM DOMINIANUM.

**S. cardinale** (cardinal). *fl.*, dorsal sepal bluish-white, faintly striped with green; petals bluish-white, with a patch of crimson-purple hairs towards the base; lip similar to that of *S. Schlumii*, but about 1in. in diameter. December. A beautiful hybrid between *S. Sedeni* and *S. Schlumii albiflorum*.

**S. caricinum** (Carex-like).\* *fl.* pale green, the sepals and petals having a white margin, and the ends being blotched with brown; petals narrow, deflexed and twisted; lip black-dotted on the inner margin, oblong; staminode bordered with black hairs; spike rising clear of the leaves, four to seven-flowered. *l.* stiff, narrow, channelled. *h.* 1ft. or more. Peru. Plant having a Sedge-like appearance. SYNS. *S. Pearcei* (F. d. S. 1648), *Cypripedium caricinum* (B. M. 5466).

**S. caudatum** (tailed).\* *fl.*, sepals and petals yellowish, marked with brown; petals tail-like, often reaching 2 $\frac{1}{2}$ it. in length, more deeply coloured towards the base; lip reddish-brown, the basal portion yellow, spotted with reddish-brown; scapes 1ft. to 1 $\frac{1}{2}$ ft. high. April and May. *l.* ensiform, distichous, light green.

**Selenipedium**—continued.

Chiriqui, Pern. 1851. A very remarkable, stemless, evergreen orchid. *SYN. Cyripedium caudatum* (F. d. S. 555; G. C. n. s., iii. p. 211; Gn. iii. 515; L. & P. F. G. i. 9; R. G. 561; R. H. 1857, p. 318, and 1885, p. 472; W. S. O. ii. 1).

**S. c. roseum** (rose-coloured). *fl.* dark rose, intermixed with the yellow and green. (I. H. 1886, 596.)

**S. conchiferum** (shell-bearing). *fl.*, dorsal sepal whitish, veined with pale greenish-yellow, oblong-triangular; petals white, veined with green at base, brownish-crimson towards the tips, twisted, ribbon-like; lip pale olive-green, having the inflexed side lobes spotted with brown, and covered at the top with green warts. A hybrid between *S. caricinum* and *S. Roezlii*.

**S. Dominicanum** (Dominy's)\*. *fl.* yellowish-green, tinged with coppery-brown; lip deep reddish-brown in front, with sharper reticulations, yellowish-green behind, the incurved mouth also yellowish, spotted with dark purple; stems erect, three-flowered. *l.* linear-elongate, broader than in *S. caricinum*, between which and *S. caudatum* this plant is a hybrid. See Fig. 471. *SYN. Cyripedium Dominicanum* (R. M. 499; F. & P. 1874, 57; Gn. iii. 491).

**S. grande** (large)\*. *fl.* large; dorsal sepal yellowish-white, veined with yellowish-green, elongated, incurved; petals ribbon-like, more than 1 ft. long, pendulous, broadest at base, where they are yellowish-white and hairy, the narrow part crimson; lip large and prominent, narrow at base, where the unfolded lobes are whitish, spotted with crimson, the front part greenish-yellow, paler and whitish beneath; staminode yellow, flushed with crimson, fringed on its upper edge with blackish-crimson hairs; scape 3 ft. high, many-flowered. *l.* sword-shaped, 2 ft. to 2½ ft. long. A grand hybrid between *S. caudatum* and *S. Roezlii*.

**S. Hincksianum** (Hincks'). *fl.*, sepals whitish-green, with nerves of a darker tint; petals light greenish, with a deep greenish middle line and a brown border at base, the tails brown; lip green, marked with some small, brown spots near the base, long and narrow. Darien, 1878. *SYN. Cyripedium Hincksianum*.

**S. kaieeteurum** (Kaieeteur Fall). A synonym of *S. Lindleyanum*.

**S. Lindenii** (Linden's)\*. *fl.*, sepals white, veined with green, broad, oval-lanceolate, the linear-ligulate petals and lip velvety-white, streaked with green at base, the points lengthened out into purplish-red, tail-like appendages, sometimes 2 ft. long; scape branching, velvety, two-flowered, 1 ft. or more high. May. *l.* erect, ligulate, obtuse, pale green, 10 in. long, forming a distinct tuft. New Grenada, 1850. *SYN. Uropedium Lindenii* (B. H. 1854, 193; F. d. S. vi. 123; R. G. 315; R. H. 1857, p. 511; R. X. O. 15).

**S. Lindleyanum** (Lindley's). *fl.*, sepals pale green, with reddish-brown nerves on the outside, pubescent, with crisped margins, the upper one hooded at apex; petals pale green, with brownish-crimson veins, 2½ in. long, falcately linear, the margins recurved and ciliated; lip light olive-green, with brownish-crimson veins, and densely dotted on the side lobes; scape many-flowered, pubescent. *l.* coriaceous, bright dark green, 7 in. to 9 in. long, 2 in. to 2½ in. broad. Kaieeteur Fall, British Guiana, 1885. *SYN. S. kaieeteurum*.

**S. longifolium** (long-leaved). *fl.*, dorsal sepal yellowish-green, streaked with purple, the lower ones large; petals green, with a red marginal band, bordered with white, several inches long; lip green, suffused with shining purplish-brown; spike many-flowered. *l.* distichous, long-ligulate, keeled, dark green. Central America, 1869. *SYN. Cyripedium longifolium* (B. H. 1873, p. 65; B. M. 5970; F. & P. 1871, 125; C. Reichenbachianum).

**S. l. coloratum** (coloured). *fl.* with purplish-veined sepals and purplish petals. *l.* broader. 1873. A fine variety.

**S. Pearcei** (Pearce's). A synonym of *S. caricinum*.

**S. porphyreum** (porphyry-coloured). *fl.* nearly purplish, very much like those of *S. Sedeni*, but the open sides of the slipper-like lip are not provided with tumid protuberances, and both petals and the odd sepal are very distinctly shaped, more tapered to the point. *l.* as in *S. Roezlii*. 1878. A hybrid between *S. Roezlii* and *S. Schlinitii*.

**S. reticulatum** (reticulated). *fl.* whitish, reticulately veined with green; dorsal sepal narrow-lanceolate, acute; lower ones broadly elliptic-oblong, very obtusely rounded at apex; petals linear, acute, twisted, horizontally spreading. Ecuador, 1885. A remarkable species.

**S. Roezlii** (Roez's)\*. *fl.* very large; dorsal sepal yellowish-green, suffused with rosy-purple on the borders, the lateral ones flesh-coloured; petals green, with a bright red-purple border and tip, linear-lanceolate, spreading; lip 3 in. long, the saccate part greenish-yellow; scape many-flowered, 3 ft. high. March to May. *l.* 2 ft. long, 2 in. broad, bright green, ligulate, keeled. New Grenada, 1873. *SYN. Cyripedium Roezlii* (B. M. 6217; F. M. ser. ii. 119; I. H. ser. iii. 138; R. G. 754).

**S. Schlinitii** (Schlinitz)\*. *fl.* 2 in. across; sepals and petals white, mottled and striped with dark rose; lip white, the front of the pouch marked with a large blotch of deep rose; stem hairy, longer than the leaves, branching, eight-flowered. *l.* ligulate, acute, 8 in. long, light green. New Grenada, 1867. See Fig. 472. *SYN. Cyripedium Schlinitii* (B. M. 5514; F. d. S. 1917; I. H. ser. iii. 183; R. X. O. i. 44).

**Selenipedium**—continued.

**S. S. albiflorum** (white-flowered). *fl.*, sepals and petals white, dusted with delicate pink at the base; lip white, suffused with rose, more deeply coloured opposite the bright yellow column. Winter. 1875. A robust, free-growing variety. *SYN. Cyripedium Schlinitii albiflorum* (I. H. 183).



FIG. 472. INFLORESCENCE AND LEAF OF SELENIPEDIUM SCHLINITII.

**S. Schröderæ** (Baroness Schröder's)\*. *fl.*, dorsal sepal pale reddish-green, lined with greenish-purple; petals whitish-green in the centre, stained with purplish-crimson, 4 in. long, very broad, turned downwards; lip dull crimson, resembling that of *S. caudatum*. December. *l.* as in *S. Sedeni*. Stems branching. A very distinct hybrid between *S. caudatum* and *S. Sedeni*. (W. O. A. 156.)

**S. Sedeni** (Seden's)\*. *fl.* large and showy; sepals greenish-white, ovate; petals longer, white, edged with purplish-crimson, twisted; lip rich crimson, white and crimson-spotted inside; stem taller than the leaves, bearing several flowers. *l.* ligulate, tapering, about 1 ft. long, deep green. A handsome hybrid between *S. longifolium* and *S. Schlinitii*. See Fig. 473. *SYN. Cyripedium Sedeni* (F. M. ser. ii. 206, 302; R. G. 1875, p. 150, and 1877, p. 85; R. H. 1879, p. 470).

**S. S. candidulum** (whitish). *fl.*, sepals and petals white, with a rosy hue on the edge; lip purple. A hybrid between *S. longifolium* and *S. Schlinitii albiflorum*.

**S. stenophyllum** (narrow-leaved). *fl.*, dorsal sepal rosy, very pallid, green-nerved; the lower one the same colour, but nearly white in the centre, shell-like; petals purplish at their ends, much bearded towards the cordate base; lip pale purplish, the mouth of the inflexed lobes greenish-white, and streaked with rows of purple blotches. *l.* lorate, linear-ligulate, acute, very long. 1876. A hybrid between *S. Schlinitii* and *S. caricinum*.

**S. vittatum** (striped). *fl.*, sepals pale green, the upper one only half as broad as the lower, striped with red; petals brownish-red, lined with green towards the base, linear, arcuate-deflexed, undulated; lip brownish, inside green, spotted with reddish-brown, shorter than the lower sepals, and half as long as the petals; scape 1 ft. to 1½ ft. high, minutely puberulous, few-flowered. *l.* 1 ft. long, linear-ligulate, acute, bright green, very distinctly margined with yellow. Brazil, 1876. (I. H. 238.)

**S. Wallisii** (Wallis'). *fl.*, sepals pale green, striped and slightly spotted with bright green; petals white, veined with green, about 8 in. long, passing into very narrow tails, tinted with very pale brown at apex; lip large, white, spotted and veined with crimson, the mouth margined with yellow; stems three to five-flowered. *l.* ligulate, acute. Ecuador. *SYN. Cyripedium Wallisii* (R. X. O. 181).

**SELF-HEAL**, or **ALL-HEAL**. See *Prunella vulgaris*.

**SELINUM**, (from *Selinon*, the Greek name for Parsley; applied to this genus on account of the resemblance in the leaves). *SYNS. Cnidium, Mylinum*. Including *Oreocome*. *ORD. Umbelliferae*. A genus comprising about twenty-five species of mostly hardy, branched, glabrous, perennial herbs; one is found in the mountainous parts of Columbia, and another in South Africa, the rest being all natives of the Northern hemisphere. Flowers white

**Semecarpus**—continued.

A genus comprising about a score species of stove, evergreen trees, inhabiting tropical Asia, and especially abundant in Ceylon. Flowers small; calyx five-cleft, the segments imbricated, deciduous; petals five, spreading, imbricated; stamens five; panicles terminal or lateral, branched, bracteate. Nuts or drupes reniform. Leaves alternate, simple, coriaceous, on simple petioles. The only species introduced requires culture similar to **Anacardium** (which see).



FIG. 473. SELENIPEDIUM SEDENL.

or rarely yellowish-green, in compound, many-rayed umbels. Leaves pinnately decomposed. The species possess no interest from a garden standpoint.

**SELLIGUEA**. Included under **Gymnogramme** (which see).

**SEMECARPUS** (from *semeion*, a mark, and *karpos*, a fruit; the black, acrid juice of the nut is used by the natives for marking cotton cloths). *ORD. Anacardiaceae*.

**S. Anacardium** (*Anacardium*). Kidney Bean of Malacca. fl. greenish-yellow, disposed in a terminal, tomentose panicle. July and August. l. oblong, rather blunt, beneath glaucous and more or less covered on the nerves with scabrous down. h. 50ft. East Indies (on mountains), 1824. (B. F. S. 166.)

**S. A. cuneifolium** (cuneate-leaved). l. wedge-shaped and acuminate at base, blunt at apex.

**SEMEIANDRA** (from *semeion*, a mark, signal, and *aner*, *andros*, a male; in allusion to the conspicuous shape of one of the stamens). *ORD. Onagrarieae*. A genus



**Semeiandra**—continued.

comprising only two species of slender, pubescent, greenhouse, evergreen shrubs, inhabiting the mountains of Mexico. Flowers scarlet, showy, axillary, solitary, pedunculate; calyx coloured, four-lobed, globose at base; petals four, small, linear-subulate; stamens two, one ending in a petal-like expansion, the other with two perfect cells. Leaves usually opposite, petiolate, oblong-lanceolate, serrated, membranous. One of the species has been introduced. It requires culture similar to **Fuchsia** (which see).

**S. grandiflora** (large-flowered). *fl.* large and handsome; calyx tube funnel-shaped, the limb cut into four very long-linear, acuminate segments, of which three are reflexed and the fourth is erect; petals four, linear-subulate. Spring. *l.* ovate or ovate-lanceolate, tapering below, acuminate at the apex, penninerved. *h.* 6ft. Mexico, 1853. (B. M. 4727.)

**SEMELE** (the name of the mother of Bacchus, after whom the genus was named). *SYN.* *Amphion*. *ORD.* *Liliaceæ*. A monotypic genus. The species is an ornamental, greenhouse, evergreen, climbing shrub, thriving in any rich soil. It may be multiplied by division of the roots.

**S. androgyna** (hermaphrodite). *fl.* small, fascicled, six to twenty in an umbel; perianth greenish-white, with a very short tube and ovate lobes; umbels solitary or few, produced from the sides, or rarely from the face, of the cladodes. April. Cladodes leaf-like, alternate or scattered, solitary at the axils of small, fuscous-membranous scales, ovate or ovate-lanceolate, acuminate, coriaceous, with many slender nerves. Stem branched. Canary Islands, 1713. *SYN.* *Ruscus androgynus* (B. M. 1898, 3029).

**SEMI**. This term, used in Latin compounds, signifies half; e.g., Semi-amplexicaul, half-clasping a stem; Semi-hastate, hastate on one side only.

**SEMI-LUNAR, SEMI-LUNATE**. Resembling a half-moon. The same as Lunate.

**SEMINAL**. Pertaining to seed.

**SEMINIFEROUS**. Seed-bearing.

**SEMPERVIRENS, SEMPERVIRENT**. Evergreen.

**SEMPERVIVUM** (the old Latin name used by Pliny, and derived from *semper vivo*, to live for ever; alluding to the well-known tenacity of the species). House Leek. Including *Eonium* and *Greenovia*. *ORD.* *Crassulaceæ*. A genus comprising fifty or more species of greenhouse or hardy, thick, fleshy herbs or subshrubs, of variable habit, often stemless, and emitting young plants from the axils, sometimes caulescent and leafy; they inhabit the mountains of Central and Southern Europe, Madeira, the Canary Islands, Asia Minor, Nubia, Abyssinia, and the Western Himalayas. Flowers white, pink, greenish, yellow, or purplish, in panicle, often dense cymes; calyx cut or parted into six or numerous segments, rarely five-cleft; petals six or numerous, free, or connate at base, and adhering to the filaments, oblong or lanceolate, acute or acuminate; stamens twice as many, or rarely the same number, as the petals, free; filaments filiform. Leaves alternate, thickly fleshy, often revolute. *S. tectorum* is found growing on walls and houses in Britain, but it is not indigenous. *Sempervivums* succeed in any sandy soil, and may be readily propagated from seeds, or by the young plants which appear round old ones at the base. All the hardy species are admirably adapted for planting on rockwork; and the greenhouse ones, *S. tabulaforme*, for instance, are valuable for succulent and carpet hedging during summer.

Mr. J. G. Baker's admirable classification of the hardy species in cultivation (published in the "Gardeners' Chronicle," n. s., vol. xii.) is appended. By its help, the names of any of the hardy species here described may be readily determined. Mr. Baker says that the following eleven forms "cannot be regarded as more than varieties or sub-species belonging to one variable specific type": *S. arverneense*, *S. atlanticum*, *S. Boissieri*, *S. Boutignyanum*, *S. calcaratum*, *S. calcareum*,

**Sempervivum**—continued.

*S. glaucum*, *S. Lamottei*, *S. Schottii*, *S. tectorum*, and *S. triste*.

**Sub-genus I. Sempervivum proper.**

Parts of the flowers usually in twelves. Open flower bell-shaped.

**RHODANTHA**.—Flowers reddish.

Group 1. *Ciliata*. Leaves of the barren rosette glabrous on the face when mature, shortly ciliated on the edges only.

Leaves large, green or slightly glaucous, with a conspicuous, red-brown tip: *S. arverneense*, *S. Boissieri*, *S. Boutignyanum*, *S. calcaratum*, *S. tectorum*.

Leaves large, green or glaucous; red-brown tip none or very obscure: *S. atlanticum*, *S. glaucum*, *S. Lamottei*, *S. Schottii*.

Leaves large, purplish-brown throughout: *S. triste*.

Leaves large, very glaucous, with a distinct red-brown tip: *S. calcaratum*.

Leaves small, green, with a distinct red-brown tip: *S. parvulum*.

Leaves small, glaucous, with a distinct red-brown tip: *S. Greenii*.

Leaves small, green; red-brown tip none or very obscure: *S. Funckii*, *S. Verlotii*.

Group 2. *Pubescentia*. Leaves of the barren rosette pubescent on the face, as well as ciliated on the edges, not tipped with a tuft of spreading hairs.

Flower small; stamens two-thirds as long as the petals: *S. assimile*.

Flower large; stamens half as long as the petals: *S. anomalum*, *S. flagelliforme*, *S. montanum*.

Group 3. *Barbatula*. Leaves of the barren rosette strongly ciliated on the edges, and furnished with a tuft of short, straight hairs at the tip.

Moderately tall: *S. Favonnetii*, *S. fimbriatum*, *S. Pometii*.

Dwarf: *S. barbatulum*.

Group 4. *Arachnoidea*. Dwarf species, with the tips of the inner leaves of the rosette connected by fine, fleecy threads, like a spider's web.

Arachnoid threads many: *S. arachnoideum*, *S. Moggridgei*.

Arachnoid threads few: *S. Doellianum*, *S. oligotrichum*.

**CHRYSANTHA**.—Flowers yellow.

Leaves obovate-cuneate, glabrous on the face: *S. Wulfenii*.

Leaves obovate-cuneate, hairy on the face: *S. Braunii*, *S. grandiflorum*, *S. ruthenicum*.

Leaves oblanceolate, very hairy on the face: *S. Pittonii*.

**Sub-genus II. Diopogon.**

Parts of the flower usually in sixes. Flowers always yellowish. Expanded flower spreading widely.

Flowers small; petals not fimbriated on the edge and keel: *S. Heuffelii*, *S. Reginae-Amalie*.

Flowers large; petals fimbriated on the edge and keel.

New rosettes rolled up into round balls: *S. arenarium*, *S. subuliferum*.

New rosettes not rolled up into round balls: *S. hirtum*.

The best-known species are described below. Except where otherwise stated, they are hardy perennials.

**S. aizoides** (Aizoon-like). *fl.* yellow, corymbose; petals five to eight, spreading. May to July. *l.* scattered, obovate, flat, quite entire, glabrous. Stem erect, branched. *h.* 1ft. Madeira. Greenhouse, evergreen shrub.

**S. anomalum** (anomalous). *fl.* four to eight in a dense head, all sessile or sub-sessile; corolla bright mauve-purple, 1in. in diameter, very hairy on the outside. June. *l.* thirty to forty to a rosette, oblanceolate, cuspidate, green, with pubescent faces, hairy-edged, the outer ones only tinted with red-brown, 3in. to 4in. long. Flowering stem 3in. to 4in. long, its leaves hairy all over and tinted with red-brown, the lowest 4in. to 3in. long. Barren rosettes not exceeding 1in. in diameter. A garden species.

**S. arachnoideum** (cobwebby)\*. *fl.* nine to twelve-parted, less than 1in. in diameter; petals bright red, lanceolate; filaments bright purple; panicle dense, few-flowered, clothed with slightly fragrant, glandular hairs. June. *l.* about fifty to a rosette, oblong-cuneate, obscurely cuspidate, minutely glandular-pubescent above, the tips connected by long, soft, white hairs; outer leaves reddish-brown at back, 3in. long. Flowering stem 3in. to 4in. long, its leaves furnished at tips with tufts of soft hairs. Barren rosettes 4in. to 3in. in diameter. Pyrenees and Central Europe, 1699. (B. M. 68; J. F. A. (App.) 42.)

**S. a. Lageri** (Lager's)\*. A large variety, having fully-developed rosettes 1½in. in diameter. See Fig. 474.

**S. arboreum** (arborescent). *fl.* golden-yellow, disposed in a loose panicle; petals none to eleven. March to December. *l.* cuneiform, glabrous, ciliated, spreading, and rosulate at the tops of the branches. Stem arborescent, smooth, branched. *h.* 3ft. to 6ft. Portugal, &c., 1640. Greenhouse, evergreen shrub. (B. R. 99; S. F. G. 473.)

**S. a. atropurpureum** (dark purple). *l.* blackish-purple. A very effective variety when grown in a sunny position.

**Sempervivum**—continued.

- S. a. variegatum** (variegated). *l.* green, margined with creamy-white.
- S. arenarium** (sand-loving).\* *fl.* six-parted, many in a dense head, 2in. to 3in. in diameter; petals pale yellow,  $\frac{1}{2}$ in. to  $\frac{3}{4}$ in. long, distinctly tricuspidate. Summer. *l.* sixty to eighty to a rosette, oblanceolate, acute, not cuspidate, minutely ciliated on the edges; outer ones a little tinted with red-brown,  $\frac{1}{2}$ in. to  $\frac{3}{4}$ in. long. Flowering stem 6in. to 9in. long, finely pubescent, the crowded leaves strongly ciliated on the margins. Rosettes (and general habit) as in *S. boboliferum*. Tyrol, 1879. SYN. *S. cornutum*.
- S. arvernense** (Auvergne). *fl.*, petals pale pink,  $\frac{1}{2}$ in. to  $\frac{3}{4}$ in. long; filaments and anthers red; panicle 2in. to 3in. long and broad, the lower flowers distinctly pedicellate. Summer. *l.* oblanceolate-cuneate, cuspidate, bright pale green, the outer ones lin. to  $1\frac{1}{2}$ in. long, the edges regularly ciliated. Flowering stem 6in. to 8in. long, the lower leaves about lin. long. Barren rosettes  $1\frac{1}{2}$ in. to 2 $\frac{1}{2}$ in. in diameter. Central France.
- S. assimile** (similar). *fl.*  $\frac{3}{4}$ in. in diameter; calyx densely pubescent; petals pale rose, linear. July. *l.* sixty to eighty to a rosette, obovate-cuneate, cuspidate, pale glaucous-green, not red-tipped, shortly ciliated on the margins, minutely pubescent on the face, the outer ones  $\frac{3}{4}$ in. to lin. long. Flowering stem about 6in. long. Barren rosettes  $1\frac{1}{2}$ in. to 2in. broad. Tyrol.
- S. atlanticum** (Atlantic).\* *fl.* pale red, lin. in diameter, twelve-parted; calyx segments twice as long as the tube; panicle short,  $\frac{3}{4}$ in. to 4in. in diameter. Summer. *l.* oblanceolate-cuneate, cuspidate, pale green, glabrous when mature, scarcely tipped with red-brown, ciliated on the margins, the outer ones lin. to  $1\frac{1}{2}$ in. long. Flowering stem nearly 1ft. long, its leaves much tinted with red-brown. Barren rosettes 2in. to 3in. in diameter. Greater Atlas, 1873. (B. M. 6055, under name of *S. tectorum atlanticum*.)



FIG. 474. SEMPERVIVUM ARACHNOIDEUM LAGGERI.

- S. aureum** (golden).\* *fl.* yellow; petals twenty, linear; stamens also twenty; panicle dichotomously-branched, many-flowered. July and August. *l.* obovate-spathulate, with membranous cartilaginous, quite entire margins, glaucous. Stem erect, glabrous. *h.* 1ft. Teneriffe, 1815. Greenhouse, herbaceous subshrub. SYNS. *S. Bollii*, *S. calyciforme* (B. R. 892), *Greenovia aureum* (B. M. 4087).
- S. barbatulum** (slightly bearded). *fl.* nine to twelve-parted; petals rose-red,  $\frac{1}{2}$ in. long; panicle compact, few-flowered, densely pilose. *l.* oblanceolate, densely pubescent, ciliated on the margins, and furnished with a dense tuft of hairs at the tip, the outer ones about  $\frac{1}{2}$ in. long. Flowering stem 3in. to 4in. high, its red-tinted, pubescent leaves  $\frac{1}{2}$ in. to  $\frac{3}{4}$ in. long. Barren rosettes about  $\frac{1}{2}$ in. in diameter. Alps. A well-marked, dwarf-habited plant.
- S. Boissieri** (Boissier's).\* *fl.* lin. in diameter, twelve to fourteen-parted; petals pale red, very hairy; filaments bright red; panicle about 2in. broad each way, the lower flowers sub-sessile. July. *l.* oblanceolate-cuneate, cuspidate, broadest near the middle, with rather long, brown cilia, hardly at all brown-tinted at top, lin. to  $1\frac{1}{2}$ in. long. Flowering stem 8in. to 9in. long, the leaves red-tinted, closely imbricated. Barren rosettes very dense, 2in. to 2 $\frac{1}{2}$ in. in diameter. 1878. A garden species.
- S. Bollii** (Boll's). A synonym of *S. aureum*.

**Sempervivum**—continued.

- S. Bontignyanum** (Bontigny's). *fl.*  $\frac{3}{4}$ in. in diameter, twelve to fourteen-parted; petals pale rose,  $\frac{1}{2}$ in. long, densely gland-ciliated; panicle 2in. to 3in. long and broad, simply branched, many-flowered. Summer. *l.* oblanceolate-cuneate, cuspidate, with a green, glabrous face and a distinct, decurrent, red-brown tip, the outer ones lin. to  $1\frac{1}{2}$ in. long. Flowering stem 6in. to 8in. long, its leaves lin. or more long. Barren rosettes 2in. to 3in. broad. Pyrenees, 1873.
- S. Braunii** (Braun's).\* *fl.* ten to twelve-parted,  $\frac{3}{4}$ in. to lin. in diameter; petals dull yellow, unspotted, with a green keel; filaments greenish, obscurely tinted with purple; panicle compact, many-flowered, 2in. to 4in. in diameter. July. *l.* thirty to forty to a rosette, obovate-cuneate, obscurely cuspidate, glandular-pubescent; outer ones obscurely purple-tipped,  $\frac{3}{4}$ in. to lin. long. Flowering stem 6in. to 9in. long, the upper part shortly pubescent, its leaves lin. to  $1\frac{1}{2}$ in. long. Barren rosettes  $1\frac{1}{2}$ in. to 2in. in diameter. Tyrol, 1874.
- S. caespitosum** (tufted). *fl.* yellow, disposed in cymose, dichotomously-branched corymbs; petals seven or eight, spreading. April to September. *l.* oblong-linear, glabrous, stiffly ciliated, marked with brown lines on both surfaces, crowded in a rosette manner; cauline ones scattered. Stem very short, at length a little branched, leafy at the apex. *h.* 6in. Grand Canary Island, 1815. Greenhouse, evergreen shrub. This plant has been known to remain alive in an herbarium for eighteen months, and to grow when subsequently planted. SYN. *S. ciliatum* (B. M. 1978).
- S. calcaratum** (spurred).\* *fl.* lin. in diameter; petals dull red-dish white,  $\frac{1}{2}$ in. long; panicle 6in. to 8in. long and broad, the lower branches deeply forked. Summer. *l.* 4in. long,  $\frac{3}{4}$ in. to lin. broad, rather glaucous, with a distinct red-brown tip, the edges bordered with stiff cilia. Flowering stem above 1ft. long. Barren rosettes 3in. to 4in. in diameter. 1874. A common form in English gardens, where it is variously known as *S. Camollei*, *S. italicum*, *S. juratum*, *S. Rojenti*, *S. rusticum*, and *S. Segueri*.
- S. calcareum** (chalk-loving).\* *fl.* ten to twelve-parted; corolla  $\frac{3}{4}$ in. in diameter; petals pale red, greenish down the keel, densely ciliated; panicle 3in. to 4in. long and broad, eight to twelve-branched. Summer. *l.* oblanceolate-cuneate, cuspidate, very glaucous, with very distinct red-brown tips, stiffly ciliated on the margins, the outer ones lin. to  $1\frac{1}{2}$ in. long. Flowering stem less than 1ft. long, with densely imbricated leaves, lin. to  $1\frac{1}{2}$ in. long. Barren rosettes about 2in. in diameter. Calcareous Alps of Dauphiné. SYN. *S. californicum* (of gardens).
- S. californicum** (Californian). A garden synonym of *S. calcaratum*.
- S. calyciforme** (calyx-formed). A synonym of *S. aureum*.
- S. Camollei** (Camolle's). A garden synonym of *S. calcaratum*.
- S. canariense** (Canary Islands).\* *fl.* white, pedicellate; petals nine or ten, linear; branches of panicle expanded. June and July. *l.* radical ones expanded, rosulate, obovate-spathulate, villous, large; cauline ones scattered, ovate. *h.*  $1\frac{1}{2}$ ft. Canary Islands, 1699. A strong-growing, greenhouse, evergreen shrub.
- S. ciliatum** (ciliated). A synonym of *S. caespitosum*.
- S. cornutum** (horned). A synonym of *S. arenarium*.
- S. cruentum** (bloody). *fl.* yellow, small, six to eight-parted, May. *l.* cuneate-spathulate, highly glabrous, thick, attenuated into the petiole, papillose on the margins, green and somewhat channelled above, slightly convex beneath. *h.* 1ft. to 2ft. Canary Islands, 1824. Greenhouse, evergreen shrub. (B. R. xxvii. 61, under name of *Aonium cruentum*.)
- S. Doellianum** (Doell's). *fl.* nine or ten-parted; calyx densely pubescent; petals bright red, lanceolate,  $\frac{1}{2}$ in. long; filaments bright purple; panicle compact, few-flowered, the larger flowers distinctly pedicellate, June. *l.* forty to fifty to a rosette, oblanceolate, obscurely cuspidate, slightly hairy above, the edges minutely ciliated, the tips of the inner leaves connected by a few cobwebby threads; outer leaves  $\frac{1}{2}$ in. to  $\frac{3}{4}$ in. long, red-tinted at back. Flowering stem 4in. to 6in. long, its leaves having only an obscure tuft of hairs at the tip. Barren rosettes  $\frac{3}{4}$ in. to  $\frac{1}{2}$ in. in diameter. Bernese Oberland. SYN. *S. heterotrichum*.
- S. Faucounneti** (Faucounnet's). *fl.* nine to twelve-parted, nearly lin. in diameter; petals bright red, lanceolate, glandular on the back and edges; filaments bright purple. Summer. *l.* about fifty to a rosette, oblanceolate, obscurely cuspidate, the surfaces with a few glandular papillae and streaks of purple, the edges ciliated with deflexed hairs, the outer leaves tinged with red, about  $\frac{3}{4}$ in. long. Flowering stem 6in. to 8in. long, clothed with long hairs. Barren rosettes  $1\frac{1}{2}$ in. in diameter. Jura Mountains. Rare in English gardens.
- S. fimbriatum** (fringed).\* *fl.* about twelve-parted, lin. in diameter; petals bright red, lanceolate, glandular on the back and edges; panicle open, the few branches bearing each six to ten flowers. July. *l.* fifty to sixty to a rosette, oblanceolate, obscurely cuspidate, all green, the edges crowded with deflexed hairs, the outer leaves turning red, and reaching  $\frac{3}{4}$ in. to  $\frac{1}{2}$ in. long. Flowering stem 6in. to 9in. high, densely glandular-pilose, the lower of the red-tinted leaves lin. to  $1\frac{1}{2}$ in. long. Barren rosettes lin. to  $1\frac{1}{2}$ in. in diameter. Alps of Dauphiné.

**Sempervivum**—continued.

**S. flagelliforme** (whip-like). *fl.* about twelve-parted, six to eight in a dense head, all sessile or nearly so; corolla bright red, above  $\frac{1}{2}$  in. in diameter, densely glandular-pilose outside. June. *l.* forty to fifty to a rosette, oblanceolate, obscurely cuspidate, minutely downy above, pale green throughout, the edge fringed with short hairs, the outer ones  $\frac{3}{4}$  in. long. Flowering stem  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long, its imbricated leaves tipped with red-brown, the lowest about  $\frac{1}{2}$  in. long. Barren rosettes  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. in diameter, with the lax new ones on long, spreading stalks. Native place unknown. Well known in cultivation.

**S. Funckii** (Funck's). \* *fl.* eleven or twelve-parted, nearly  $\frac{1}{2}$  in. in diameter; petals bright red-purple, densely glandular-pubescent; panicle  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in diameter, the lower flowers distinctly pedicellate. July. *l.* eighty to a hundred to a rosette, oblanceolate-cuneate, cuspidate, green and glabrous at maturity, not tipped with red-brown, fringed with dense, marginal cilia, the outer ones  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long. Flowering stem  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long, densely pilose, the lower leaves  $\frac{1}{2}$  in. long. Barren rosettes  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. in diameter, surrounded by a dense circle of young ones on bright red, decumbent footstalks. Tyrol, &c. (B. H. 1873, 13, under name of *S. Funckii aquilense*.)

**S. glaucum** (glaucous). *fl.*  $\frac{1}{2}$  in. in diameter; petals bright red, more than twice as long as the calyx; filaments deep purple; panicle short,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in diameter, the branches few-flowered. Summer. *l.* oblanceolate-cuneate, cuspidate, glabrous, ciliated on the margins, having only a faint red-brown spot at the tip. Flowering stem  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long, densely hairy above. Barren rosettes  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in diameter. Simplon Alps.

**S. globiferum** (globe-bearing). A synonym of *S. grandiflorum*.

**S. glutinosum** (clammy). *fl.* golden-yellow; petals eight to ten; panicle loosely branched. July and August. *l.* cuneiform, viscid, rather scattered, fringed with adpressed, cartilaginous cilia. *h.* 2 ft. Madeira, 1777. Greenhouse, evergreen shrub. (B. M. 1963; B. R. 278.)

**S. grandiflorum** (large-flowered). *fl.* few, very large, ten to twelve-parted, sub-sessile, in a dense head; corolla  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. in diameter; petals pale yellow, with a flush of purple inside at the base; stamens generally bright mauve-purple. Summer. *l.* about forty to a rosette, obovate-cuneate, obscurely cuspidate, pubescent, the very tip reddish-brown; outer ones spreading,  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long. Flowering stem  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long, densely pubescent, its crowded leaves  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long. Barren rosettes about  $\frac{1}{2}$  in. in diameter, the new ones on decumbent peduncles  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long. Native country unknown. (B. M. 2115; B. M. 507, under name of *S. globiferum*.)

**S. Greenii** (Green's). *fl.* eleven or twelve-parted,  $\frac{1}{2}$  in. in diameter; petals pale red, densely ciliated; filaments bright mauve-purple; panicle  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. broad, three or four-branched. July. *l.* forty to fifty to a rosette, oblanceolate-cuneate, cuspidate, glaucous, with a distinct brown-red tip, ciliated on the edges, the outer ones  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long. Flowering stem  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long, its hairy, red-tinted leaves  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long. Barren rosettes about  $\frac{1}{2}$  in. in diameter. Probably the French Alps. 1877.

**S. heterotrichum** (variably hairy). A synonym of *S. Doellianum*.

**S. Heuffelii** (Heuffel's). \* *fl.* six-parted; calyx bright red-brown when old; petals pale straw-yellow,  $\frac{1}{2}$  in. long, permanently erect, with three small cusps; panicle dense, many-flowered,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in diameter, the lower flowers pedicellate. August. *l.* thirty to forty to a rosette, obovate-cuneate, distinctly cuspidate, the upper third, or even half, tinted with bright red-brown, the margins stiffly ciliated; outer leaves spreading,  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long. Flowering stem  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long, densely pubescent, its close, red-brown leaves  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long. Barren rosettes  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. in diameter. Transylvania and Greece. (R. G. 858, Fig. 2, under name of *S. patens*.)

**S. hirtum** (hairy). *fl.* usually six-parted; petals pale yellow,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, lanceolate, the point tricuspidate; panicle few or many-flowered,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. in diameter. June. *l.* about fifty to a rosette, obovate-cuneate, finely glandular-pubescent, ciliated down the margins; outer ones faintly tinted with red,  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long. Flowering stem  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long, densely pilose, the crowded leaves pubescent. Barren rosettes  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. in diameter, not lebular. Central Europe, 1804. (A. F. P. 65.)

**S. hirtum** (hairy). A synonym of *S. soboliferum*.

**S. holochrysum** (wholly golden). *fl.* golden, glabrous; hypogynous scales broad, truncate, very slightly emarginate; panicle  $\frac{3}{4}$  in. long, very dense, pyramidal. December to February. *l.* dark green, spatulate, obtuse, glabrous, shining, cartilaginously ciliated, attenuated-tetragonal at base, red-margined at apex. Stem shrubby, erect. Teneriffe, 1816. Greenhouse. SYN. *S. urticum* (B. R. 1741).

**S. italicum** (Italian). A garden synonym of *S. calcaratum*.

**S. juratum** (sworn). A garden synonym of *S. calcaratum*.

**S. Lamottei** (Lamotte's). \* *fl.*  $\frac{1}{2}$  in. in diameter, twelve to sixteen-parted; calyx densely pilose; petals pale pink; filaments bright purple; panicle like that of *S. testorum*. Summer. *l.* obovate-cuneate, cuspidate, glabrous on the faces; outer ones  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, with stiff marginal cilia, and very faintly red-brown tinted at the tip. Flowering stem often above  $\frac{1}{2}$  in. long. Barren rosettes  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. in diameter. Central France.

**S. Moggridgei** (Moggridge's). \* *fl.* red, cymose,  $\frac{3}{4}$  in. in diameter;

**Sempervivum**—continued.

calyx cup-shaped, glandular-pubescent; petals twice as long as the sepals, spreading. September. *l.*  $\frac{1}{2}$  in. long, elongate-cuneate or oblanceolate, green, glabrous, with minutely ciliated margins and acute tips; lower cauline ones pale green and reddish. Flowering stem  $\frac{3}{4}$  in. high, stout, leafy. Rosettes  $\frac{1}{2}$  in. in diameter, of about a hundred leaves. Alps, 1881. (B. M. 6610.)

**S. monanthes** (one-flowered). *fl.* purplish, small; petals six to nine, scarcely longer than the calyx; scales obcordate; peduncles naked, generally one, rarely few, flowered. July to September. *l.* terete, clavate, glabrous, crowded in a rosulate manner. *h.*  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. Canary Islands, 1777. A very dwarf, greenhouse, evergreen shrub. (B. M. 93.)

**S. montanum** (mountain). \* *fl.* twelve to fourteen-parted; petals bright mauve-purple,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long, linear, acuminate; panicle very dense,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. in diameter, the branches very pilose, and the lowest flowers nearly sessile. June. *l.* tightly packed, sixty to eighty to a rosette, oblanceolate-cuneate, cuspidate, entirely green, slightly pilose on the face, regularly ciliated on the margins, the outer ones  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long. Flowering stem about  $\frac{1}{2}$  in. long, the densely imbricated leaves tipped with red-brown, the lower ones  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long. Barren rosettes  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. in diameter. Alps and Pyrenees. (J. F. A. v. 41.)

**S. oligotrichum** (few-haired). *fl.* about ten-parted,  $\frac{3}{4}$  in. in diameter, in a dense head; petals bright red; filaments bright purple. Summer. *l.* thirty to forty to a rosette, oblanceolate, obscurely cuspidate, minutely pubescent, the edges minutely ciliated; inner ones connected by a few cobwebby threads, which nearly or quite disappear at flowering time; outer ones about  $\frac{3}{4}$  in. long. Flowering stem  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long, its leaves bright red and densely pubescent. Barren rosettes about  $\frac{1}{2}$  in. in diameter. Tyrol.

**S. Paiva** (Baron Paiva's). *fl.* green, scentless,  $\frac{3}{4}$  in. broad; petals erecto-patent, acuminate, with recurved and spirally twisted tips. August. *l.* highly glaucous,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. broad, those of the flowering branches thick and fleshy, of the barren ones thinner, and finely serrulate-ciliated. Canary Islands, 1866. A low, straggling, greenhouse, evergreen shrub. (B. M. 5593.)

**S. parvulum** (rather small). *fl.*  $\frac{1}{2}$  in. in diameter; petals pale red; panicle short, corymbose, about  $\frac{1}{2}$  in. in diameter. July. *l.* oblanceolate-cuneate, cuspidate, with a distinct, red-brown tip, minutely but stiffly ciliated on the edges, the outer ones about  $\frac{1}{2}$  in. long. Flowering stem  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long, very pilose, its leaves red-brown, the lowest  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long. Barren rosettes  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. in diameter. Alps of Dauphiné, 1878. A rare form in cultivation.

**S. Pittoni** (Pitton's). *fl.* nine to twelve-parted, ten to twenty in a dense head,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. in diameter, densely pilose; petals primrose-yellow, whitish inside towards the base,  $\frac{1}{2}$  in. long, lanceolate; filaments pale. July. *l.* sixty to eighty to a fully-developed barren rosette, oblanceolate, tipped with claret-purple, densely and persistently pubescent, the tip deltoid-cuspidate; outer ones about  $\frac{3}{4}$  in. long. Flowering stem  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long, densely pilose, its leaves tipped with claret-purple. Barren rosettes  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. in diameter, the young ones sessile. Alps of Styria.

**S. Pomelii** (Pomel's). \* *fl.* ten to twelve-parted; corolla bright rose-red, about  $\frac{1}{2}$  in. in diameter; petals widely spreading; panicle  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. in diameter, its simple branches bearing six to twelve flowers. July. *l.* fifty to sixty to a rosette, oblanceolate, distinctly cuspidate, with a few hairs on both surfaces, the outer ones tinged with red,  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long. Flowering stem  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long, densely pilose, its hairy leaves much imbricated, the lower ones  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long. Barren rosettes  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. in diameter. Auvergne.

**S. Reginae-Amalie** (Queen Amalia's of Greece). *fl.* six or seven-parted; petals pale yellow, ligulate, obtuse; panicle dense, many-flowered, capitate, the lowest flowers shortly pedicellate. Summer. *l.* a hundred or more to a rosette, obovate-cuneate, distinctly cuspidate, bright purplish-brown in the upper half, the edges ciliated; outer ones spreading,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long. Flowering stem  $\frac{3}{4}$  in. high, densely pubescent, the crowded leaves brown. Barren rosettes about  $\frac{1}{2}$  in. in diameter. Greece.

**S. Royeni** (Roen's). A garden synonym of *S. calcaratum*.

**S. rusticum** (rustic). A garden synonym of *S. calcaratum*.

**S. ruthenicum** (Russian). *fl.* about twelve-parted; petals pale yellow, linear, not more than  $\frac{3}{4}$  in. long; filaments finally bright mauve-purple; panicle short and compact, densely pubescent. Summer. *l.* forty to fifty to a rosette, obovate-cuneate, cuspidate, slightly glandular-pubescent, ciliated at edges with short, decurved hairs; outer ones tinted at back,  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long. Flowering stem  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long, shortly pubescent upwards. Barren rosettes  $\frac{1}{2}$  in. in diameter. South-east Russia, &c.

**S. Schottii** (Schott's). *l.* twelve to fourteen-parted; lower ones densely sessile; petals pale red, with a deeper keel, twice as long as the calyx; filaments deep purple; panicle short and compact,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. in diameter. Summer. *l.* oblanceolate-cuneate, cuspidate, glabrous, ciliated on the margins, scarcely tipped with red-brown, the outer ones  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long. Flowering stem nearly  $\frac{1}{2}$  in. long, its oblong-lanceolate, red-tinted leaves  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long. Barren rosettes  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. in diameter. Tyrol, 1874.

**Sempervivum**—continued.

- S. Seguierei** (Seguiér's). A garden synonym of *S. calcaratum*.
- S. Smithii** (Smith's). *fl.* pale yellow, sessile; petals twelve, oval-oblong, spreading; branches of the panicle revolute at the points, bearing flowers on the upper side. July and August. *l.* scattered, obovate, acuminate, flat, concave, slightly spotted. Stem erect, hispid. *h.* 1 ft. Canary Islands, 1815. Greenhouse, evergreen shrub. (B. M. 1980.)
- S. soboliferum** (sobole-bearing).\* Hen-and-Chickens House-leek. *fl.* six or seven-parted; petals pale yellow, lanceolate,  $\frac{3}{4}$  in. long, obscurely tricuspidate; panicle short, dense, many-flowered,  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. in diameter, the lower flowers distinctly pedicellate. Summer. *l.* sixty to eighty to a rosette, obovate-cuneate, obscurely cuspidate, minutely ciliated on the edges; outer ones tinted with bright red-brown,  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long. Flowering stem  $\frac{6}{8}$  in. to  $\frac{9}{8}$  in. long, very robust, quite hidden by the leaves. Barren rosettes globose,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. in diameter; the copious new sessile ones attached to the parent only by a slender thread. Austria. A well-known garden plant. (B. M. 1457; J. F. A. 12, under name of *S. hirtum*.)
- S. stellatum** (star-like). *fl.* golden-yellow, panicked; petals six to eight, spreading; scales palmate, with subulate lobes. July and August. *l.* scattered, oblong, spatulately cuneiform, obtuse, villous. Stem erect, branched, puberulous. *h.*  $\frac{6}{8}$  in. Madeira, 1790. Greenhouse annual. (B. M. 1809, under name of *S. villosum*.)
- S. tabulæforme** (table-formed).\* *fl.* very pale sulphur-coloured; petals ten to twelve, linear-lanceolate; glands minute, pedunculate. June and July. *l.* spatulate, flat, ciliated, attenuated at base, crowded at the top of the stem, and forming a flat, rosulate disk, in consequence of being so closely imbricated over each other. *h.* 1 ft. Madeira, 1817. Greenhouse, evergreen shrub.
- S. tectorum** (roof-living). Bullock's Eye; Common Houseleek; Jupiter's Beard; Sengreen. *fl.*  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. in diameter; petals linear, pale red, keeled with deeper red; filaments bright purple; panicle  $\frac{5}{8}$  in. to  $\frac{6}{8}$  in. long, with ten or twelve scorpioid branches. July. *l.* fifty to sixty to a rosette, obovate-cuneate, cuspidate,  $\frac{1}{4}$  in. to  $\frac{2}{8}$  in., or finally  $\frac{3}{8}$  in., long, pale green, with a distinct red-brown tip, the edges ciliated. Flowering stem about 1 ft. long, densely pilose. Barren rosettes  $\frac{3}{4}$  in. to  $\frac{4}{8}$  in. in diameter. Britain (but not indigenous). (Sy. En. B. 538.)
- S. t. atlanticum** (Atlantic). See *S. atlanticum*.
- S. tortuosum** (twisted). *fl.* yellow; petals seven or eight, spreading; scales two-lobed. July and August. *l.* obovate-spatulate, scattered, rather convex beneath, nearly or quite  $\frac{1}{2}$  in. long and  $\frac{1}{8}$  in. broad. Stem erect, branched. *h.*  $\frac{6}{8}$  in. to  $\frac{9}{8}$  in. Canary Islands, 1779. Greenhouse, evergreen shrub. (B. M. 296.)
- S. triste** (sad). *fl.*, calyx deeply tinted with red-brown; corolla bright red,  $\frac{1}{2}$  in. in diameter; panicle  $\frac{6}{8}$  in. long,  $\frac{3}{4}$  in. to  $\frac{4}{8}$  in. in diameter, the larger flowers distinctly pedicellate. Summer. *l.* oblanceolate-cuneate, cuspidate, glabrous, the margins shortly ciliated, the whole upper part, both back and face, suffused with red-brown. Flowering stem as robust as in *S. tectorum*, its leaves strongly tinted with red-brown, the lower ones  $\frac{2}{8}$  in. to  $\frac{3}{8}$  in. long. Barren rosettes  $\frac{2}{8}$  in. to  $\frac{3}{8}$  in. in diameter. A rare garden form.
- S. urbicum** (city), of Lindley. A synonym of *S. holochrysum*.
- S. Verloti** (Verlot's). *fl.* twelve to fourteen-parted,  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. in diameter; petals rose-red, densely ciliated on the back and edge; filaments bright purple; panicle  $\frac{3}{4}$  in. to  $\frac{4}{8}$  in. in diameter, each of the simple branches eight to twelve-flowered. July. *l.* about fifty to a rosette, oblanceolate-cuneate, cuspidate, faintly glaucous, only red-brown at the extreme tip, ciliated on the margins, the outer ones  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long. Flowering stems  $\frac{6}{8}$  in. to  $\frac{9}{8}$  in. long, the lowest leaves about  $\frac{1}{2}$  in. long. Barren rosettes  $\frac{1}{2}$  in. to  $\frac{2}{8}$  in. in diameter. Alps of Dauphiné.
- S. villosum** (villous). *fl.* yellow, with fringed scales. June and July. *l.* obovate, crowded, gibbous beneath, villous, five lines long, three lines broad. Stem rather erect, twisted. *h.*  $\frac{6}{8}$  in. to  $\frac{9}{8}$  in. Canary Islands, 1777. Greenhouse, evergreen shrub. (B. R. 1555.)
- S. Wulfenii** (Wulfen's).\* *fl.* twelve to fourteen-parted; petals pale yellow,  $\frac{3}{4}$  in. long, linear; filaments bright mauve-purple; panicle short, dense,  $\frac{2}{8}$  in. to  $\frac{3}{8}$  in. in diameter, densely pilose. Summer. *l.* about fifty to a rosette, obovate-cuneate, cuspidate, slightly glaucous, faintly tinted with red-brown at the tip, the edges ciliated; outer ones  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long. Flowering stem  $\frac{6}{8}$  in. to  $\frac{9}{8}$  in. long, densely pilose upwards, its lanceolate leaves  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long. Barren rosettes  $\frac{1}{2}$  in. to  $\frac{2}{8}$  in. in diameter. Central Europe. Habit of *S. tectorum*. (J. F. A. sup. 40, under name of *S. globiferum*.)
- S. Youngianum** (Young's). *fl.* yellow. June. *l.* sub-cartilaginous, thick, shining green, obovate-spatulate, sub-tetragonal at base, absolutely mucronate at apex, shortly ciliated on the margins. Stem thick. *h.*  $\frac{3}{4}$  ft. Canary Islands, 1843. Greenhouse, evergreen shrub. (B. R. xxx. 35, under name of *Æonium Youngianum*.)

**SENACIA.** Included under *Pittosporum*.

**SENARY.** In sixes.

**SENECA, SENEGA, or SENEKA SNAKE-ROOT.** See *Polygala Senega*.

**SENECIO** (the old Latin name used by Pliny, and derived from *senex*, an old man; alluding to the usually white, hair-like pappus). Groundsel; Ragweed. Including *Adenotrichia*, *Brachyrhynchus*, *Cacalia*, *Cineraria* (in part), *Farfugium*, *Gynoxys* (in part), *Jacobaea*, *Kleinia* (of Haworth), *Ligularia*, *Pericallis*, *Senecillis*, and *Syneilesis* (*Cacalia*, *Cineraria*, and *Ligularia*, are, however, for garden purposes, kept distinct in this work). ORD. *Compositæ*. A vast genus—probably the most extensive in the vegetable kingdom—comprising, according to Benthams and Hooker, nearly 900 species of stove, greenhouse, or hardy, annual, biennial, or perennial herbs, sub-shrubs, or shrubs, rarely arborescent, dispersed over the whole globe, but most numerous in temperate or mountainous regions. Flower-heads radiate-beterogamous or discoid-homogamous, solitary or corymbose, very rarely disposed in pyramidal panicles, sub-racemose or sessile at the sides of the branches; involucre bracts in one series, with sometimes a few smaller ones at the base, at length often reflexed; receptacle flat or slightly convex; ray florets, when present, variously coloured, one-seriate, ligulate; disk yellow, whitish, or rarely purplish or violet; achenes glabrous or slightly villous, of variable form and size. Leaves alternate or radical, entire, toothed, lobed, or variously (often pinnately) dissected. The genus is represented in Britain by nine species (two of which, however, are not indigenous, but have become naturalised), including the Ragweed or Ragwort (*S. Jacobaea*) and Groundsel (*S. vulgaris*). South Africa is richest in species in the Old World, and the Andean region in the New. A representative selection of the plants best known to horticulturists is given below. Senecios are easy to grow; they succeed in almost any loamy soil. The annuals may readily be increased by seeds, which, in many instances, ripen in abundance. Other representatives of the genus may be propagated by seeds, by divisions, or by cuttings both of the shoots and roots. See also *Cacalia*, *Cineraria*, and *Ligularia*.

- S. aconitifolius** (Aconite-leaved). *fl.*-heads pinkish-red, small, discoid, disposed in loose corymbs. *l.* on long petioles, palmately parted; lobes several, with a few strong teeth. Stem tall, striated. Amur, North China, 1877. A hardy perennial, of little beauty. SYN. *Syneilesis aconitifolia* (R. C. 887).
- S. Adenotrichia** (Adenotrichia). *fl.*-heads yellow; involucre campanulate, biseriate, the outer scales linear-subulate; ray florets twelve to fifteen. May. *l.* auriculate-amplexicaul, oblong, pinnatifid, unequally toothed. Branches nearly naked at apex, dichotomously sub-corymbose. *h.* 2 ft. Chili, 1826. Greenhouse, glandular-pilose sub-shrub. (B. R. 1190, under name of *Adenotrichia amplexicaulis*.)
- S. ampullaceus** (bottle-shaped). *fl.*-heads yellow, about  $\frac{1}{2}$  in. in diameter, in a corymbose panicle; involucre at length bottle-shaped; ray florets few, spreading. July. *l.* oblong, obtuse, fleshy, deeply toothed, sub-cordate at base, semi-amplexicaul. Stems striated, branched above. *h.* 2 ft. Texas, 1834. An erect, highly glabrous, half-hardy annual. (B. M. 3487.)
- S. Antephorbium** (so named "because of its being a reputed antidote against the acrid poison of the Cape *Euphorbium*," Hooker). *fl.*-heads yellow, with a rose tinge,  $\frac{1}{2}$  in. long, cylindric, erect, solitary, axillary; involucre bracts numerous; florets all tubular, scarcely exceeding the involucre; peduncles very stout, with a few scattered bracts. January. *l.* about  $\frac{1}{2}$  in. long, erect, oblong or linear-oblong, acute or obtuse, fleshy, entire, on very short petioles. Stem thick, fleshy, cylindric; branches  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. in diameter, constricted at base. *h.* 3 ft. to 4 ft. South Africa, &c., 1595. Greenhouse, succulent shrub. (B. M. 6099.)
- S. argenteus** (silvery).\* *fl.*-heads yellowish, solitary; involucre campanulate, scarcely bracteolate, with about twenty scales; ray florets about twelve, linear-oblong. Summer. *l.* linear, entire, obtuse; upper ones few, acute. Branches adpressedly silvery-tomentose. *h.* 1 ft. to 2 ft. Chili. Greenhouse under-shrub.
- S. chordifolia** (cord-leaved).\* *fl.*-heads yellow, very few,  $\frac{3}{4}$  in. long, narrow; involucre leaflets about sixteen, with a few bristle-shaped bracteoles at base; pappus white; cymes very slender,  $\frac{6}{8}$  in. to  $\frac{1}{2}$  in. long, sparingly forked, the branches erect. July. *l.*  $\frac{7}{8}$  in. to  $\frac{1}{2}$  in. long,  $\frac{1}{2}$  in. in diameter, acute, cylindric, but flattened above towards the base. Stem slightly branched. *h.* 1 ft. South Africa, 1862. A greenhouse, glabrous, fleshy sub-shrub. (B. M. 6216.)
- S. concolor** (one-coloured). *fl.*-heads  $\frac{1}{2}$  in. in diameter; ray florets mauve-purple; disk white; anthers purple; corymbs three to five-headed. Summer. *l.* glabrous; radical ones narrow-ob lanceolate, toothed; cauline ones amplexicaul, broadly linear

**Senecio**—continued.

- Stem 1ft. to 2ft. high, loosely branched above. South Africa, 1882. A pretty, half-hardy perennial. (B. M. 6713.)
- S. diversifolius pinnatifidus** (variable-leaved, pinnatifid). *fl.*-heads purple, discoid; peduncles elongated, simple or branched, scaly. June. *l.* lanceolate-oblong, acute or acuminate, deeply pinnatifid; lobes in many pairs, toothed or incised, the uppermost two or three pairs confluent in a pinnatifid, terminal lobe. Stem erect, leafy below. *h.* 2ft. South Africa. Half-hardy perennial. SYN. *Brachyrhynchus albicaulis*.
- S. Doria** (Doria).\* *fl.*-heads yellow; accessory involucre scales linear-subulate; ray florets five or six; corymbs compound, loosely sub-paniculate. August. *l.* toothed, rather thick, sub-glaucous; radical ones petiolate, oval-oblong; cauline ones slightly amplexicaul, sub-decurrent, oblong-lanceolate. Stems erect, striated, glabrous. *h.* 4ft. South Europe, 1870. Hardy perennial. (J. F. A. 185.)
- S. Doronicum** (Leopard's Bane).\* *fl.*-heads yellow, 2in. in diameter, solitary or few; involucre bracteate, campanulate, the scales lanceolate, acuminate; ray florets twelve to twenty-five, flat; achenes glabrous, striated. Summer. *l.* rather thick, toothed; radical ones lanceolate, elliptic, or ovate-cordate, on short or long petioles, sub-elliptic or obtuse. *h.* 1ft. South Europe, 1705. Hardy perennial. (J. F. A. v. 45.)
- S. D. hosmariensis** (Beni-Hosmar). *fl.*-heads rich yellow, on a scape 3in. to 5in. high. *l.*, radical ones lin. to 1½in. long, ovate, elliptic-ovate, or ovate-cordate, acute or obtuse, irregularly toothed, dark green, rugose, and glabrous above, greenish-white beneath; cauline ones few, narrow. Beni-Hosmar, Morocco, 1874. A pretty rockwork plant. (B. M. 6101.)
- S. elaeagnifolius** (Elaeagnus-leaved). *fl.*-heads yellow, ½in. long, campanulate, rayless; panicle terminal, stout, branched, buff-woolly. *l.* ½in. to 1in. long, on stout petioles, obovate or lanceolate-oblong, obtuse, entire; branches buff-tomentose. *h.* 6ft. to 8ft. New Zealand. Greenhouse shrub.
- S. elegans** (elegant).\* *fl.*-heads radiate, showy, on long, scaly pedicels; involucre calyced with many ciliated, black-tipped bracteoles; ray florets purple; disk yellow. *l.* 1½in. to 3in. long, ear-clipping at base, petioled, extremely varied in shape and degree of incision. Stems erect, 1ft. to 2ft. high, or diffuse. South Africa. A viscid pubescent, half-hardy annual or biennial. A variety with double flowers is the well-known "American Groundsel" of our gardens.
- S. e. erectus** (erect). *fl.*-heads, involucre scales glabrous. *l.* frequently pinnate or bipinnatifid. Stem erect, slender. (B. M. 238, under name of *S. elegans*.)
- S. fulgens** (brilliant). *fl.*-heads bright orange-vermilion, erect or inclined, ½in. long; involucre terete, the leaflets eight to ten, acute; florets slender, tubular, with linear-oblong lobes; peduncles 4in. to 8in. long, erect, loosely clothed with succulent bracts. May. *l.* succulent, 4in. to 6in. long, on short, broad petioles, obovate-oblong, sub-acute, remotely serrated, smooth. Stems branched, terete. *h.* 2ft. to 3ft. Natal, 1866. A greenhouse, succulent sub-shrub, covered with pale green, glaucous bloom. (B. M. 5590, under name of *Kleinia fulgens*.)
- S. Ghiesbreghtii** (Ghiesbreght's). A synonym of *S. grandifolius*.
- S. glastifolius** (wood-leaved). *fl.*-heads purple, radiate; involucre amply calyced with subulate bracteoles; panicle many-headed, loosely corymbose. June. *l.* oblong or oblong-lanceolate, 1in. to 3in. long, acute, coarsely and unequally toothed, half-amplexicaul, the lower ones more or less decurrent. Stems erect, branching. *h.* 4ft. South Africa, 1826. Greenhouse sub-shrub. (B. R. 1342, under name of *S. ulacinus*.)
- S. grandiflorus** (large-flowered). *fl.*-heads in a loosely corymbose panicle; involucre amply calyced with many subulate, spreading bracteoles; ray florets purple; disk yellow. August. *l.*, cauline ones sessile, half-amplexicaul, 3in. to 6in. long, pinnatifid; lobes several on each side, linear, acuminate. Stems 4ft. to 5ft. high, naked at top. South Africa, 1774. Greenhouse perennial. (B. R. 901, under name of *S. venustus*.)
- S. grandifolius** (large-leaved). *fl.*-heads yellow, in a terminal corymb. *l.* deep green, about 1ft. long, coarsely toothed or lobed. Stems deep purple, curiously spotted or warted. *h.* 3ft. to 4ft. Mexico. A half-hardy shrub, useful for massing or isolating on the lawn as a foliage plant. SYN. *S. Ghiesbreghtii*. (R. G. 296.)
- S. Haworthii** (Haworth's). *fl.*-heads orange-yellow, solitary, erect, 1½in. long, cylindric, discoid; involucre scales appressed, shorter than the florets; peduncle terminal, 2in. long. July. *l.* 1in. to 2in. long, cylindric or ellipsoid, acute, narrowed into short petioles. Stem erect; branches cylindric. South Africa, 1873. A small, succulent, greenhouse under-shrub, clothed with soft, snow-white wool. (B. M. 6063.)
- S. incanus** (hoary). *fl.*-heads yellow, disposed in a simple, somewhat crowded corymb; involucre about half as long as the florets; calyces few. August. *l.* bright silvery; lower ones obovate, with incised lobes, the upper ones overlapping; upper leaves oblong, with separate, linear leaflets. Stems tufted. *h.* 3in. to 6in. Alps. A pretty and compact, hardy perennial, altogether white with adpressed hairs.
- S. Kämpferi aureo-maculata** (Kämpfer's gold-spotted). A synonym of *Ligularia Kämpferi aureo-maculata*.
- S. laciniatus** (torn). "l. slender, pale green, finely cut into long, narrow lobes, drooping gracefully from the upper part of the

**Senecio**—continued.

- slender, half-woody stems. This half-hardy sub-shrub is one of the most elegant of all foliage plants. It should not be allowed to flower" ("Thompson's Gardeners' Assistant").
- S. Lagopus** (hare's-foot). *fl.*-heads bright yellow, radiate, ½in. to 1in. in diameter, on slender pedicels; pappus hairs white; scape 2in. to 6in. high, branched above, two to eight-headed. Summer. *l.* 1in. to 4in. long, on short, stout, villous petioles, broadly cordate-oblong, rounded at the tip, white-woolly beneath, wrinkled and covered with bristles above. Crown of the root loaded with matted hairs. New Zealand, 1882. Hardy, perennial, rockwork plant.
- S. macroglossus** (large-tongued).\* Cape Ivy. *fl.*-heads on long, axillary peduncles; ray florets eight to twelve, pale yellow, forming a limb about 3in. across, multiseriate. Summer. *l.* petiolate, hastate, with acuminate basal lobes, or cordate, acute or acuminate, entire, or with one or two broad teeth or lobules on each side. Stems smooth and glossy. South Africa, 1875. A greenhouse, evergreen, soft-wooded climber, with Ivy-like leaves; it is well suited for training to a rafter. (B. M. 6149; F. d. S. 2188; G. C. n. s., iii. p. 749.)
- S. mikanioides** (Mikania-like).\* German Ivy. *fl.*-heads yellow, discoid; involucre sparingly calyced, of eight or nine narrow scales; corymb generally much-branched. December. *l.* somewhat fleshy, petiolate, sharply five to seven-angled or lobed, hastate or cordate at base, the lobes deltoid or obsolete, with broad, shallow interspaces; petioles 1in. to 1½in. long. *h.* several feet. South Africa, 1855. A much-branched, climbing, greenhouse sub-shrub, forming an admirable window creeper. SYN. *Mikania senecioides* (of gardens).
- S. multibracteatus** (many-bracted). *fl.*-heads sub-corymbose, on very long, copiously scaly pedicels; involucre of many dark-tipped, glabrous scales, amply calyced with many imbricating bracts; ray florets purple; disk yellow. Summer. *l.* 2in. to 2½in. long; cauline ones sessile, not auricled, lanceolate, coarsely few-toothed, tapering at base; rameal ones stem-clasping, coarsely toothed at base. Stems 1ft. to 1½ft. high, branched above. South Africa, 1872. A sparsely pubescent, greenhouse annual. (Ref. B. 251.)
- S. praecox** (early). *fl.*-heads yellow, appearing before the leaves, on elongated pedicels; involucre cylindrical, eight to ten-leafleted, almost ebracteate; ray florets five, spreading; corymbs branched, seven or eight-headed. June. *l.* petiolate, cordate, acute, five to seven-angled or lobed, membranous. Stem fleshy-shrubby, branched, terete. *h.* 2ft. Mexico. A glabrous, greenhouse sub-shrub. (B. M. 4803.)
- S. pteroneura** (wing-nerved). *fl.*-heads pale straw-colour, solitary, or two or three at the tips of the branches, erect, cylindric, scarcely ½in. long; involucre scales brownish-red about the middle; florets narrow, slender; peduncles very stout, longer than the involucre. November. *l.* only developed on very young shoots, elliptic or lanceolate, ½in. to 1in. long. Stems 4ft. to 8ft. high, loose, nearly erect; branches ½in. in diameter, nearly straight, obtuse. Morocco, 1872. A highly glabrous, glaucous, fleshy-shrubby, greenhouse plant. (B. M. 5945.)

FIG. 475. **SENECIO PULCHER.**

- S. pulcher** (pretty).\* *fl.*-heads large, corymbose; involucre very broadly campanulate, calyced with pubescent-woolly, obtuse



**Senecio**—continued.

leafflets; ray florets nearly twenty, purple, longer than the yellow disk. Summer and autumn. *l.* oblong-lanceolate, crenate-toothed; radical ones petiolate; cauline ones sessile; upper ones half-amplexicaul, and slightly decurrent. Stem simple or branched. *h.* 1ft. to 2ft. Uruguay, 1872. A pretty, cobwebby-tomentose, hardy perennial. See Fig. 475. (B. M. 5959; R. H. 1877, p. 94.)

**S. pyramidalis** (pyramidal).\* *fl.*-heads yellow, many,  $\frac{3}{4}$ in. in diameter, exclusive of the ten or twelve broad, spreading ray florets, disposed in a long, thyrsoid raceme,  $\frac{6}{16}$ in. to  $\frac{12}{16}$ in. long; involucre sub-calyculate, campanulate, woolly, of ten to twelve very broad scales. Summer. *l.* sessile, sub-terete, fleshy, acute,  $\frac{3}{16}$ in. long, two to three lines wide, glabrous or cobwebby. Stem shrubby, fleshy, erect, simple, closely leafy below, sparsely so above, tomentose. *h.* about 2ft. South Africa, 1863. A very fine, greenhouse species. (B. M. 5396.)

**S. scaposus caulescens** (scaped, caulescent). *fl.*-heads yellow; involucre cobwebby, scarcely calyced; ray florets about twelve; peduncles scape-like, 1ft. to 1 $\frac{1}{2}$ ft. long, naked or sparsely scaly, usually bearing three to five long-pedicelled heads. August. *l.*  $\frac{2}{16}$ in. to  $\frac{3}{16}$ in. long, crowded at the apex of the stem or branches, fleshy, broadly linear, very obtuse, terete, the young ones cobwebby, the older ones glabrous. Stem fleshy-shrubby, 1ft. high, branched. South Africa, 1843. Greenhouse. (B. M. 4011, under name of *S. calamifolius*.)

**S. Skinneri** (Skinner's). *fl.*-heads yellowish, fragrant, in terminal, corymbose racemes; ray florets few; bracteoles four to six, much spreading, subulate. June. *l.* alternate, rather long-petiolate, ovate or ovate-lanceolate, acute, slightly fleshy, entire, indistinctly veined. *h.* 5ft. Guatemala, 1840. A pretty, highly glabrous, greenhouse, perennial climber, with tuberos roots. (B. M. 4511; L. & P. F. G. i. p. 77, f. 54; and L. J. F. 18, under name of *Gynozys fragrans*.)

**S. speciosus** (showy).\* *fl.*-heads bright purple,  $\frac{1}{2}$ in. in diameter, long-peduncled, in spreading corymbs; involucre densely glandular-hairy; ray florets six to twenty, narrow-linear; scape 1ft. or less high, with alternate, rather distant, erect leaves. July. *l.*  $\frac{4}{16}$ in. to  $\frac{7}{16}$ in. long, obovate, lanceolate, or narrowly linear-spathulate, crenately toothed or sinuately lobed, rarely sub-pinnatifid, sub-acute or obtuse, glandular-hairy. South Africa, 1789. Greenhouse perennial. (B. M. 6488; B. R. 41; L. B. C. 1113; G. C. n. s., xiv. p. 149; R. G. 1881, p. 310; A. B. R. 291, under name of *S. pseudo-china*.)

**S. stenocephala comosa** (narrow-headed, tufted). *fl.*-heads yellow, with three ray florets, disposed in a dense, narrow-oblong spike. Summer. *l.* radical ones on long petioles, broadly ovate-sagittate, acuminate. Stem 2ft. high. Japan, 1881. A striking and ornamental, hardy perennial. (G. C. n. s., xvi. p. 301.) The flower-heads in the typical form possess but one ray floret each.

**S. sub-scandens** (somewhat climbing). *fl.*-heads  $\frac{1}{2}$ in. long, cylindric; involucre bracts five, red-tipped; florets about ten, dark ochreous-yellow, exceeding the involucre; pappus snow-white; cymes axillary and terminal, long-peduncled, much-branched. January. *l.*  $\frac{5}{16}$ in. to  $\frac{9}{16}$ in. long, pink-veined, pinnatifid; lateral lobes two to six pairs, ovate or orbicular, distant, adnate, coarsely sinuate-toothed; terminal one deltoid, deeply cordate at base. Stems and branches cylindric, succulent. South Africa, 1873. A tall, herbaceous climber. (B. M. 6363.)

**S. uniflorus** (one-flowered). *fl.*-heads yellow, few on long stalks, or solitary; involucre turbinate, half as long as the disk; ray florets expanding. July. *l.* lower ones divided, stalked, oblong; upper ones sessile, linear, entire. *h.*  $\frac{3}{16}$ in. Alps of Europe, 1785. A pretty, cano-tomentose, hardy perennial, allied to *S. incanus*. (A. F. P. 17.)

**SENEGA.** Included under **Polygala** (which see).

**SENGREEN.** A popular name for *Saxifraga nivalis* and *Sempervivum tectorum*.

**SENNA.** The leaves of *Cassia acutifolia*, *C. angustifolia*, and other allied species.

**SENNA, BLADDER.** See **Colutea**.

**SENNA, SCORPION.** See **Coronilla Emerus**.

**SENSITIVE BRIAR.** See **Schrankia uncinata**.

**SENSITIVE PLANT.** See **Mimosa**.

**SEPAL.** One of the parts that, together, form the calyx, or outermost whorl of a flower. The Sepals are usually green, and unlike the petals (*e.g.*, in the Rose), but may resemble them (*e.g.*, in the Tulip). They may be free from one another, but often are more or less closely united by their edges to form a tube or cup. Their chief use is to protect the more delicate inner organs of the flowers from injury while growing.

**SEPALINE, SEPALOUS.** Relating to sepals.

**SEPALODY.** A name used to indicate the change of petals, &c., into sepals or sepaloid organs.

**SEPALOID.** Resembling a sepal.

**SEPTAS** (of Linnæus). Included under *Crassula*.

**SEPTAS** (of Loureiro). A synonym of *Herpestis*.

**SEPTATE.** Separated by a partition or septum.

**SEPTFOIL.** A common name for *Potentilla Tormentilla*.

**SEPTICIDAL.** When a capsule dehisces through the dissepiments or lines of junction.

**SEPTIFEROUS.** Partition-bearing.

**SEPTIFRAGAL.** "A mode of dehiscing, in which the backs of the carpels separate from the dissepiments, whether formed by their sides or by expansions of the placenta" (Lindley).

**SEPTORIA.** See **Sphæropsidea**.

**SEPTUM.** A partition.

**SEQUOIA** (derivation obscure, but it has been suggested that it is "a modification of *See-gua-yah*, the name of a celebrated Cherokee chief," Hemsley). Syns. *Gigantabies*, *Washingtonia*, *Wellingtonia*. ORD. *Conifera*. A small genus (two species) of gigantic, hardy, evergreen, densely branched trees, natives of California. Flowers monœcious, the males in the upper axils or at the tips of the branchlets, solitary; female catkins terminal, ovoid or oblong. Leaves alternate, spirally affixed, in *S. sempervirens* often sub-lanceolate and distichously spreading, in *S. gigantea* frequently much shorter, more obtuse, and appressedly imbricated, but leaves of both forms are sometimes observable in each species. Cones  $\frac{1}{2}$ in. to  $1\frac{1}{2}$ in. long. "The timber is of a beautiful red colour, fine and close-grained, but light and brittle, and never attacked by insects. It is the Californian Redwood or Bastard-tree of the settlers" (Gordon, "The Pinetum"). The following interesting particulars respecting the dimensions of these trees in a grove in Yo Semite Valley, are gleaned from the "Gardeners' Chronicle," n. s., x. 240: "The grove contains between ninety and a hundred big specimens of the *Sequoia gigantea*, growing out of the thick forest. The 'Father of the Forest,' a great prostrate trunk, measures 435ft. in length, and 110ft. in circumference. He must have been much longer when living. Along the inside of the fallen trunk is a tunnel 35ft. long, and, in places, 8ft. to 10ft. high. The 'Mother of the Forest,' standing at the farther end of the grove, is 327ft. high, and 90ft. in circumference. She stands quite dead and bare, having suffered from the ravages of fire, and is entirely barkless from top to bottom. A great living monster is the 'Pioneer's Cabin,' probably so called from a recess in the lower part of the trunk big enough to hold a large family party at breakfast. The circumference of this tree 5ft. from the ground is 92ft. by our own measuring. Perhaps the most beautiful of the trees in the grove are three named 'The Three Graces.' They stand only a few feet apart, and, with their branches intertwining, run up to an almost equal height of 265ft. Another great tree is called the 'Key Stone State,' 325ft. high; its branches begin at 150ft. from the ground. But perhaps the greatest curiosity is a big fellow, which has been purposely thrown, cut off 6ft. above the ground, and a pavilion built on the standing stump. There is room enough in the pavilion for a very pretty dance—space for two sets of Lancers, or for sixteen couples to spin round with ease. We measured the dancing space, and found the diameter 30ft., less 20in.; the circumference, 85ft."

Sequoias are readily propagated by means of cuttings, inserted in sandy loam, under a hand glass, in autumn, and kept shaded from bright sunlight, in a somewhat moist atmosphere, until roots are formed. The variegated forms

**Sequoia**—continued.

are better grafted. All are almost indifferent as to soil. When seeds are to be had, they should be sown in a cold frame, in spring, and the seedlings transplanted, as soon as they are large enough to handle, to the open ground.

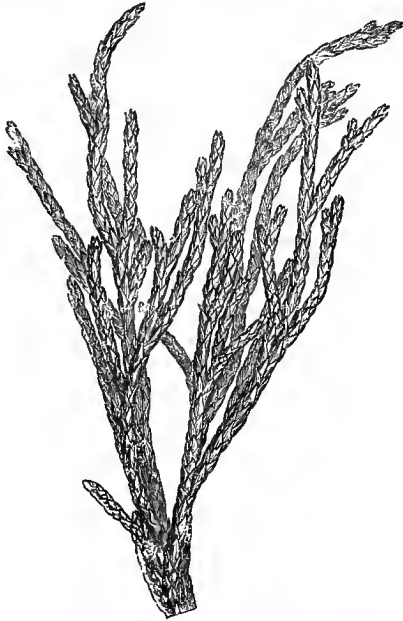


FIG. 476. YOUNG BRANCH OF SEQUOIA GIGANTEA.

**S. gigantea** (gigantic)\* Big-tree; Mammoth-tree. *l.* needle-shaped, spirally alternate, spreading, light green on young plants; those on adult trees scale-formed, closely inlaid, rounded at back, concave above; those on the branchlets much shorter, very close, and regularly imbricated; those on the larger branches longer, looser, decurrent at base, and tapering to an acute point. *cones* solitary on the ends of the branchlets, 2 in. long, ovate, blunt. Branches horizontal, much divided; branches cylindrical, frequently pendulous, thickly leafy. 1853. See Figs. 476 and 477. *Syn.* *Wellingtonia gigantea* (B. M. 4777-8; F. d. S. 892-3).



FIG. 477. BRANCHLET OF SEQUOIA GIGANTEA, WITH CONE.

**Sequoia**—continued.

**S. g. aurea** (golden). This differs from the type only in the golden or yellowish colour of some of the smaller twigs. It is a pretty form when in good condition.

**S. g. pendula** (pendulous)\* Branches numerous, deflexed from their base, drooping regularly one over the other, so as to produce an elegant, compact, conical plant. 1871.

**S. sempervirens** (evergreen)\* Californian Evergreen Redwood. *fl.*, males globular, solitary at the tips of the branchlets, on slender footstalks, thickly covered with small, scale-like leaves. *l.* on the lateral branches and branchlets linear, blunt, two-rowed, flat, alternate, straight, rarely falcate, shining,  $\frac{1}{2}$  in. to 1 in. long; those on the main branches and terminal points of the flower-bearing branchlets very short, narrow, sharp-pointed, or scale-like, imbricated or closely spiral. *cones* solitary, terminal, globular or egg-shaped, 1 in. long; scales cuneiform. Branches horizontally spreading, irregularly scattered alternately along the stem; branchlets very numerous, in two rows, frequently drooping. The leaves turn purplish-brown in winter.

**S. s. albo-spica** (white-spiked). A form in which the tips of the young shoots are of a creamy-white colour.

**S. s. glauca** (glaucous). *l.* linear, acute,  $\frac{1}{2}$  in. long, of a fine glaucous-blue tint, particularly below, either loosely imbricated or openly disposed round the branches. Branchlets very much narrower and slenderer than in the type.



FIG. 478. FRUITING BRANCHLET OF SEQUOIA SEMPERVIRENS TAXIFOLIA.

**S. s. taxifolia** (Yew-leaved). This variety only differs from the type in having somewhat broader leaves. See Fig. 478.

**SERANGIUM.** A synonym of **Monstera** (which see).

**SERAPHYTA** (from *ser*, a silkworm, and *phyton*, a plant; in allusion to some fancied resemblance between the flower and the silkworm). *ORD.* *Orchideae*. A monotypic genus. The species is a stove, epiphytal orchid, formerly included under **Epidendrum** (which see for culture).

**S. diffusa** (diffuse). *fl.* greenish-white, rather small, loosely racemose, pedicellate, forming a terminal panicle; sepals and petals equal, spreading; lip undivided, broadly cordate, the claw as long as the column. April. *l.* coriaceous, oblong or rather broad; sheaths closely appressed. Stem leafy, sheathing, and scarcely fleshy at base. *h.* 1 ft. to 2 ft. West Indies, 1816. *Syn.* *Epidendrum diffusum* (B. M. 3565; L. B. C. 846).

**SERAPIAS** (the old Greek name given by Dioscorides to one of the Orchids, and derived from the Egyptian deity Serapis). *Syn.* *Helleborine*. *ORD.* *Orchideae*. A small genus (four or five species) of hardy, terrestrial orchids, natives of the Mediterranean region,

**Serapias**—continued.

one extending as far as the Azores. Flowers often rather large, few in a spike; sepals erect, connivent or coherent in a tube; petals sometimes smaller, sometimes scarcely shorter, but much narrower; lip three-lobed, the lateral lobes erect, the middle one tongue-shaped and pendulous. Leaves narrow. Tubers undivided. In habit the species much resemble those of **Orchis** (which see for culture).

**S. cordigera** (heart-bearing).\* Heart-flowered *Orchis*. *fl.* brown and lavender; lateral segments of the lip obtuse, erect, connivent; middle one longer, ovate, often cordate at base, acuminate, the disk pilose, the basilar callus deeply bilobed; bracts often longer than the flowers; spike at first crowded. *h.* 1 ft. South Europe, 1806. (A. B. R. 475; B. M. 5868A; S. F. G. 932.)

**S. Lingua** (tongue-lipped). Tongue-flowered *Orchis*. *fl.* reddish-brown; lateral segments of the lip ovate, obtuse; middle one longer and narrower, oblong-lanceolate, acuminate; basilar callus obscure, sulcate or flat; bracts shorter than the flowers; spike at first loose. *h.* 1 ft. South Europe, 1786. (B. M. 5868B; H. E. F. 111; L. B. C. 655; S. F. G. 931.) The variety *luteola* has yellowish and purplish flowers.

**S. papilionacea-lingua** (a natural hybrid between *Orchis papilionacea* and *S. Lingua*). *fl.* five or six to a spike; sepals and petals pale green and pale purple, veined; petals erect, free, broad, spreading, and recurved; lip bright purple, large, broadly cordate, the margins crenulate, the base with two tubercles on the very short claw. *l.* narrow-lanceolate, acuminate, pale green, unspotted. Stem 1 ft. or more high. South of France, 1876. (B. M. 6255.)

**SERENOA** (named in honour of Sereno Watson, a distinguished North American botanist). ORD. *Palmæ*. A monotypic genus. The species is a handsome, greenhouse, dwarf, unarmed, tufted palm, closely allied to **Sabal** (which see for culture).

**S. serrulata** (serrulated).\* Saw Palmetto. *fl.*, petals scarcely united; style slender; spadix densely tomentose, much shorter than the leaves. June. *fr.* black, eight to nine lines long. *l.* 2 ft. to 4 ft. high, circular in outline, fan-shaped, bright green; divisions fifteen to thirty, erect, slightly cleft at the apex, and without thread-like filaments in the sinuses; petioles plano-convex, slender, more or less spiny-edged, longer than the leaves. Stem 4 ft. to 8 ft. long, creeping, branching. Southern United States, 1840. SYN. *Sabal serrulata*.

**SERIAL, SERIATE**. Disposed in rows or series.

**SERIANA**. A synonym of **Serjania** (which see).

**SERICEOUS**. Silky; covered with closely-pressed, soft, straight pubescence.

**SERICOCARPUS** (from *serikos*, silken, and *karpus*, a fruit; alluding to the silky hairs on the achenes). White-topped Aster. ORD. *Compositæ*. A genus comprising five species of hardy, erect, perennial herbs, natives of North America. Flower-heads mediocre or small, corymbose or paniculate; involucre bracts rather broad, in many series; ray florets white; disk pale yellow, rarely changing to purplish; achenes silky-pilose; pappus bristles copious. Leaves alternate, sessile, entire or serrated. For culture of the under-mentioned species, see **Aster** (under which they are erroneously classed in some garden works).

**S. conyzoides** (Conyza-like). Silk Fruit. *fl.*-heads sometimes solitary and pedicellate, but usually sessile in small clusters; involucre somewhat turbinate; pappus ferruginous. June to August. *l.* ciliated, glabrous beneath, veiny, rather firm, lin. to 3 in. long. *h.* 1 ft. to 2 ft. 1778.

**S. solidagineus** (Solidago-like). *fl.*-heads small, glomerate at the extremities of the fastigate peduncles; involucre cylindrical; pappus white. July to September. *l.* linear-oblongate or linear, obtuse, tapering to the base, entire, with serrulate-scabrous margins, obscurely dotted. *h.* 2 ft. 1699.

**SERICOGRAPHIS**. Included under **Jacobinia** (which see).

**SERINGIA** (named in honour of Nicholas Charles Seringe, 1776-1858, Professor and Director of the Botanical Gardens at Lyons). SYN. *Gaya*. ORD. *Sterculiaceæ*. A monotypic genus. The species is an interesting, greenhouse, evergreen shrub, somewhat resembling a *Commersonia* in habit. A compost of sand, loam, and peat is most suitable to its culture. Propagation may

**Seringia**—continued.

be effected by young cuttings, inserted in similar soil, under a glass; or by seeds.

**S. platyphylla** (broad-leaved). *fl.* white, disposed in dense, terminal or leaf-opposed cymes, which are much shorter than the leaves; calyx about 1 in. long; petals none; stamens five, alternating with the calyx lobes. June. *l.* ovate to ovate-lanceolate, acuminate, coarsely toothed, 3 in. to 4 in. or even 5 in. long, often oblique at base, glabrous or sprinkled with minute, stellate hairs above, densely tomentose beneath. Branches loosely whitish or rusty-tomentose. *h.* 10 ft. Australia, 1822.

**SERINGIA** (of Sprengel). A synonym of **Ptelidium** (which see).

**SERIPHIMUM**. Included under **Stœbe** (which see).

**SERISSA** (a name altered from the old Greek *Seris*, used by Dioscorides). SYN. *Democritea*, *Dysoda*. ORD. *Rubiaceæ*. A monotypic genus. The species is a pretty, greenhouse, branched shrub, highly glabrous or with puberulous branchlets, the bark foetid. It succeeds best in a mixture of loam, peat, and sand. Propagation may be effected by cuttings, inserted in sand, under a glass, in heat.

**S. foetida** (stinking). *fl.* white, axillary or terminal, solitary or fasciated; calyx tube obconical, the limb four to six-parted, persistent; corolla funnel-shaped, pilose within the throat, the limb of four to six short, obtusely three-lobed, erecto-patent lobes. Summer. *l.* rather small, opposite, sub-sessile, often fasciated on shortened branchlets, sub-coriaceous, ovate, acuminate, nerved. *h.* 2 ft. India, China, Japan, &c., 1787. (B. M. 361, under name of *Lycium japonicum*.) There is a variety with double flowers (a rare occurrence in this order), and another with gold-margined leaves (J. H. ser. I. 369).

**SERJANIA** (named in honour of Paul Serjeant, a French friar and botanist). SYN. *Seriana*. ORD. *Sapindaceæ*. A large genus (about sixty species) of stove, climbing or twining shrubs, all natives of tropical and sub-tropical South America. Flowers yellowish; sepals five (or four and two of them connate), imbricated, concave; petals four; racemes or panicles axillary, often bearing two tendrils. Leaves alternate, exstipulate (or with minute stipules), ternate, biternate, or impari-pinnate, often pellucid-dotted. A few of the species have been introduced, but they boast of no particular beauty, and are probably only cultivated in botanical gardens.

**SEROTINUS**. Comparatively late.

**SERPENT WITHE**. A common name for *Aristolochia odoratissima*.

**SERPENT-WOOD**. A common name for *Rauwolfia serpentina*.

**SERPICULA** (from *serpo*, to creep; alluding to the habit of the species). SYN. *Laurentbergia*. ORD. *Haloragacæ*. A genus comprising from two to four species of small, greenhouse, decumbent or creeping, branched herbs, inhabiting marshes in the warmer parts of Asia, Africa, and America. Flowers minute, usually fasciculate. Leaves opposite and alternate, sub-sessile, linear or lanceolate, entire or toothed. *S. repens*, a native of South Africa, the only species introduced, is now probably lost to cultivation.

**SERPILLOPSIS**. Included under *Trichomanes*.

**SERRATE, SERRATED**. Beset with antrorse teeth.

**SERRATULA** (from *serrula*, a little saw; alluding to the serrated foliage). Saw-wort. ORD. *Compositæ*. A genus comprising about thirty species of hardy, perennial herbs, natives of Europe, North Africa, and Asia. Flower-heads purplish, violet, or rarely white, solitary or corymbose; involucre bracts many, imbricated, the outer ones shorter, the inner ones more or less scarious at the tips; receptacle densely bristly; florets regular, five-lobed; pappus hairs many-seriate, coloured. Leaves alternate, toothed or lyrate-pinnatifid. The genus is represented in Britain by *S. tinctoria*, the herbage of which



**Serratula**—continued.

yields a yellow dye. None of the species are very ornamental, the only one calling for description being *S. quinquefolia*. This thrives in any common soil, and may be increased by seeds, or by divisions. Several species erroneously included here by garden authorities are now placed under *Jurinea*, *Liatris*, &c.

**S. quinquefolia** (five-leaved). *fl.* heads intense purple; involucre scales ovate, shortly mucronate, appressed, the inner ones elongated and scarious. July. *l.* slightly glabrous, impari-pinnatifid; lobes sub-higuate, confluent, ovate-lanceolate, toothed, the terminal one large. *h.* 3ft. Caucasus, 1804. (B. M. 1871.)

**SERRULATE, SERRULATED.** Serrate, with very small or fine teeth.

**SERRURIA** (named in honour of Dr. James Serurier, Professor of Botany at Utrecht). ORD. *Proteaceae*. A genus comprising about fifty-two species of desirable, greenhouse, densely leafy shrubs, confined to South Africa. Flowers solitary under the bracts, sessile, densely capitate, sub-regular; perianth narrow, often incurved, the limb ovoid or oblong, the segments cohering towards the base; hypogynous scales four, linear or filiform. Leaves scattered, very narrow, trifid, pinnatifid, or dissected, rarely undivided. A selection of the species known in gardens is given below. They require precisely similar treatment to *Protea* (which see).

**S. abrotanifolia** (Abrotanum-leaved). *fl.* pink, the segments shortly bearded; stigma black; heads sessile, nearly as large as a walnut. July. *l.* lin. to 1½ in. long, slender, biternate, bipinnatifid above the middle, pilose. Branches glabrous. *h.* 3ft. 1803. SYN. *Protea abrotanifolia hirta* (A. B. R. 522).

**S. arenaria** (sand-loving). *fl.* purple, five lines long; heads longer than the tomentose peduncles, globose, about the size of a cherry. July. *l.* clustered, often secund, about 2 in. long, slender, pinnate or trifid, the adults glabrous. Branches slender, simple. *h.* 1ft. 1803. Shrub erect or decumbent.

**S. Burmanni** (Burmans's). *fl.* purple, three to four lines long, clothed with dense, whitish or yellowish pubescence; partial peduncles shorter than the globose, many-flowered heads; corymb much-branched, rather shorter than the leaves. July. *l.* 1½ in. long, slender, bipinnate; young ones clothed with short, cano-sericeous, adpressed pubescence, rarely spreading. *h.* 2½ft. 1786. Shrub erect, much-branched.

**S. elongata** (lengthened). *fl.* purple, minutely pubescent; bracts reddish-fuscescent. *l.* 3 in. long; heads as large as a cherry, sixteen to twenty-flowered; peduncle 3 in. to 10 in. long, leafless, remotely bracteate; partial ones ½ in. to 1½ in. long, few-bracted. July. *l.* 3 in. to 4 in. long, digitate, slightly wrinkled, obovately sulcate, and, as well as the erect branches, glabrous. *h.* 1½ft. to 2ft. 1810.

**S. emarginata** (emarginate). *fl.* pink, small, the segments slightly pilose; bracts lanceolate, acute, pink at apex; heads terminal and springing from the upper axils, simple, as large as a cherry. July. *l.* clustered, about 1 in. long, slender, acute, bipinnatifid above the middle (or biternate), pubescent. *h.* 2ft. 1800. SYN. *Protea abrotanifolia minor* (A. B. R. 536).

**S. florida** (flowery). *fl.* purple, five to six lines long, the lamina bearded with golden-fulvous silk; heads in imbricating bracts, seven to nine lines long, approximate-corymbose, globose or ovoid, longer than the bracteate peduncle. July. *l.* spreading, 2 in. to 3 in. long, all pinnate or bipinnate, slender; young ones slightly pilose; adults (as well as the ascending branches) glabrous. Stem corymbosely branched. *h.* 2ft. 1824.

**S. glaberrima** (highly glabrous). *fl.* purple, very glabrous, or the young ones having a silky tube; heads as large as a cherry, globose, or at length ovoid, axillary or terminal, few-flowered; peduncles about 1 in. long, the axillary ones slightly nodding, the terminal ones erect. July. *l.* remote, acute, erecto-patent, trifid or rarely pinnately five-cleft or sub-pinnatifid; upper ones undivided. Stem 1ft. or more long, prostrate, very slender. 1825. Adult plant highly glabrous.

**S. millefolia** (Milfoil-like). *fl.* purple; bracts glabrous at the apex; stigma truncate; peduncles equalling, or longer than, the simple heads. July. *l.* bipinnatifid from the base, pilose. *h.* 4ft. 1803. SYN. *Protea tritermata* (A. B. R. 537).

**S. nitida** (shining). *fl.* purple, with very narrow claws; bracts nearly equalling the flowers, the outer ones glabrous, the inner ones very silky-villous; heads twice as long as the peduncles. July. *l.* nearly 1½ in. long, pinnatifid or nearly bipinnatifid, slender, and, as well as the branches, highly glabrous. *h.* 2ft. 1823.

**S. Niveni** (Niven's). *fl.* purple, densely bearded; bracts lanceolate; heads sub-sessile, as large as a cherry. July. *l.* spreading, nearly 1 in. long, bipinnatifid, channelled within, very acutely

**Serruria**—continued.

mucronate, and, as well as the branches, highly glabrous. *h.* 9 in. 1800. Plant decumbent, much-branched. SYN. *Protea decumbens* (A. B. R. 549).

**S. odorata** (odorons). *fl.* pink, odorons, the outer ones at length reflexed-spreading; heads simple, terminal. July. *l.* bipinnatifid-filiform, acute, pilose. Sterile branchlets corymbosely, exceeding the heads. *h.* 2ft. 1803. SYN. *Protea abrotanifolia odorata* (A. B. R. 545).

**S. pedunculata** (long-pedunculate). *fl.* purple, densely pubescent, slender, incurved; heads as large as a walnut or prune, solitary or corymbosely; peduncles 1½ in. to 3 in. long, fulvous-tomentose. July. *l.* clustered, 1½ft. to 2ft. long, shortly pubescent, hi- or tripinnate nearly to the base. Branchlets often umbellate. *h.* 7ft. 1789. SYN. *Protea glomerata* (A. B. R. 254).

**S. phyllicoides** (Phylla-like). *fl.* purple, the claw highly glabrous, the lamina snowy-bearded; heads as large as a hazel nut; peduncles sub-corymbosely, longer than the heads. July. *l.* spreading, 1½ in. to 2 in. long, once-sulcate above, bipinnatifid or pinnatifid, glabrous; segments ½ in. to 1 in. long, undivided or rarely bifid, rather obtuse. Branches twiggily, loose, leafy. *h.* 3ft. 1789. SYN. *Protea abrotanifolia* (A. B. R. 507).

**S. pinnata** (pinnate). *fl.* pink, sometimes sub-arcuate, clothed with shortly appressed, whitish pubescence; heads globose, as large as a walnut, with villous-tomentose scales; peduncles ½ in. to 1 in. long. July. *l.* erect, 1 in. to 1½ in. long, slender, once-sulcate above, pinnately three to five-cleft, semi-terete, spreading-pilose, at length glabrous. Branches elongated, loosely leafy. 1803. Shrub prostrate. (A. B. R. 512.)

**S. Roxburghii** (Roxburgh's). *fl.* white, four to five lines long, loosely and adpressedly villous; heads ranging in size between a hazel nut and a plum, fulvous-villous. July. *l.* spreading, five to seven lines long, flabelliform, bipinnate, semi-trifid; segments divaricate, two or three-cleft or pinnatifid, minutely mucronulate. *h.* 3ft. to 4ft. 1806.

**S. rubricaulis** (red-stemmed). *fl.* purple, adpressedly silky-villous; bracts scarious; partial heads few-flowered; common peduncle shorter than the head, glabrous. July. *l.* erect, 1 in. to 1½ in. long, bipinnate or sub-pinnate, nearly glabrous. Branches straight, reddish, glabrous or slightly spreading-pilose. *h.* 2ft. 1818.

**S. tritermata** (tritermate). *fl.* purple, four to five lines long, densely pubescent; heads globose, as large as a cherry, densely many-flowered, at length slightly recurved; partial peduncles 1 in. to 2 in. long. July. *l.* spreading, 3 in. to 5 in. long, tritermate or bipinnate, and, as well as the branches, glabrous; segments half spreading, ½ in. to 1½ in. long. Branches twiggily. *h.* 7ft. 1802. SYN. *Protea argenteiflora* (A. B. R. 447).

**S. villosa** (villous). *fl.* purple, four to five lines long; heads as large as a cherry or a walnut, sessile, or sometimes very shortly pedunculate. July. *l.* spreading, nearly 1 in., rarely 1½ in., long, sub-biternate, at length glabrous; segments slightly diverging, with a slender, incurved or rarely straight mucro. Branches umbellate, straight. *h.* 2ft. or more. 1829.

**SERSALISIA** (in part). A synonym of *Lucuma* (which see).

**SERTIFERA** (from *sertum*, a garland, and *fero*, I bear; in allusion to the form of inflorescence). ORD. *Orchideae*. A monotypic genus. The species is a stove, terrestrial orchid, having rather small flowers borne on rather long pedicels in short racemes, sessile, plicate-veined leaves, and a creeping rhizome. It is a native of Ecuador, but is not yet grown in gardens.

**SERVICE BERRY.** A common name for the fruit of *Amelanchier canadensis*.

**SERVICE-TREE.** See *Pyrus domestica*. The name is also applied to several other species.

**SESAME.** See *Sesamum indicum*.

**SESAMUM** (from *Sesamon*, the old Greek name used by Hippocrates). ORD. *Pedaliaceae*. A genus comprising nine or ten species of stove, erect or prostrate herbs, all native of tropical or South Africa. Flowers pale or violet, solitary in the axils, shortly pedicellate; calyx rather small, five-parted; corolla tube decurved; limb sub-bilabiate, the lobes five, somewhat spreading; stamens four. Capsules oblong or ovoid, two-celled, each cell containing numerous oily seeds. Lowest leaves opposite; uppermost ones, or nearly all, alternate, petiolate, entire, cut-toothed, trifid, or pedatisect. *S. indicum*, the only species in cultivation, is extensively grown in tropical countries for the oil contained in its seeds, which is sometimes called Gingelly Oil. For culture, see *Martynia*.

**Sesamum**—continued.

**S. indicum** (Indian). Gingelly or Gingilie Oil-plant; Sesame or Oily Grain, &c. *fl.*, sepals  $\frac{1}{2}$  in. long; corolla whitish, or with red, purplish, or yellow marks; pedicels solitary, rarely in twos or threes. July. *fr.* lin. by  $\frac{1}{2}$  in., erect, two, or ultimately four-valved. *l.* oblong or ovate,  $\frac{3}{8}$  in. to  $\frac{5}{8}$  in. long, variable; upper ones often narrowly oblong and nearly entire; middle ones ovate and toothed; lower ones lobed or pedatisect. *h.* 1 ft. to 2 ft. India, &c. 1731. See Fig. 479. (B. M. 1688; B. M. Pl. 198.) **SYNS.** *S. luteum*, *S. orientale* (B. H. ix. 27).

**S. luteum** (yellow). A synonym of *S. indicum*.

**S. orientale** (Eastern). A synonym of *S. indicum*.

**Sesbania**—continued.

**S. macrocarpa** (large-fruited). *fl.* yellow and red, dotted with purple; racemes shorter than the leaves, one to four-flowered, August and September. Pods 8 in. to 12 in. long, pendulous, many-seeded. *l.*, leaflets oblong-linear, obtuse, mucronate. *h.* 3 ft. Florida, Mexico, 1820. Greenhouse annual.

**S. picta** (painted). *fl.* yellow, the standard variegated with black dotted lines; racemes many-flowered, nodding. July and August. *l.* with twelve to sixteen pairs of oblong-linear, obtuse leaflets. *h.* 4 ft. to 6 ft. New Spain, 1823. Stove biennial. (B. R. 873.)

**S. platycarpa** (flat-fruited). A synonym of *S. vesicaria*.



FIG. 479. UPPER PORTION OF PLANT OF SESAMUM INDICUM.

**SESBAN.** See **Sesbania ægyptiaca**.

**SESBANIA** (from *Sesban*, the Arabic name of *S. ægyptiaca*). Pea-tree. Including *Agati* (inadvertently kept distinct in vol. i.), *Daubentonia*, and *Glottidium*. **ORD.** Leguminosæ. A genus comprising about sixteen species of stove or greenhouse herbs or shrubs, sometimes arborescent, inhabiting the warmer regions. Flowers yellow, dull scarlet, purple, variegated, or white, on slender pedicels; calyx broad; standard orbicular or ovate, spreading or reflexed, the wings falcate-oblong, the keel incurved; bracts and bracteoles bristly; racemes axillary, lax. Pods linear or rarely oblong, compressed. Leaves abruptly pinnate; leaflets many-jugate, entire; stipules highly caducous; stipels minute or absent. The species best known to cultivation are described below. All thrive in a compost of loam and sandy peat. The annuals may be increased by seeds; the shrubby kinds by cuttings of the half-ripened, stubby shoots, inserted in sand, under a bell glass, in heat.

**S. ægyptiaca** (Egyptian). *Sesban*. *fl.* yellow; standard roundish and without dots. July and August. *l.*, leaflets ten pairs, oblong-linear, obtuse, and rather mucronate. *h.* 5 ft. Egypt, &c., 1680. Stove shrub.

**S. grandiflora** (large-flowered). *fl.* rose-red, white, or rusty-yellow, large; standard oval-oblong, shorter than the wings; racemes few-flowered. July and August. Pods  $\frac{1}{2}$  ft. long. *l.* consisting of many pairs of glabrous leaflets. *h.* 14 ft. to 26 ft. East Indies, 1768. Stove tree.

**S. longifolia** (long-leaved). *fl.* yellow; racemes a little shorter than the leaves. June to August. *l.* having eleven or twelve pairs of lanceolate, acute leaflets. *h.* 6 ft. New Spain, 1820. Stove shrub.

**S. punicea** (red). *fl.* vermillion, in racemes. July. *l.* like those of the false Acacia. *h.* 3 ft. Texas, 1820. A common plant in various parts of India. Oriental and Rio Grande, where it grows into a large, handsome shrub. Stove. **SYN.** *Daubentonia punicea*.

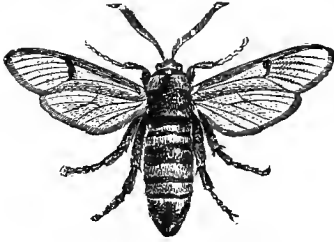
**S. vesicaria** (bladdery). *fl.* yellow, few, loose; standard reniform, very short and broad; racemes axillary, pedunculate. July and August. *l.*, primordial ones ovate, simple, the rest abruptly pinnate, many-jugate. *h.* 5 ft. to 7 ft. Florida and Carolina, 1816. Greenhouse annual. **SYNS.** *S. platycarpa*, *Glottidium floridanum*.

**SESELI** (an old Greek name, used by Hippocrates, &c., for an umbelliferous plant). Meadow Saxifrage. Including *Bubon*, *Libanotis*, and *Wallrothia*. A genus comprising about forty species of mostly hardy, perennial or rarely biennial, erect, branched herbs, nearly all inhabiting the North temperate regions. Flowers white, in compound umbels; petals rather broad; involucre bracts numerous, few, or absent. Leaves ternate-pinnate, dissected or decompound; segments sometimes filiform, sometimes broader and incised. *S. dichotomum* and *S. gummiferum* are the only species calling for description here. *S. Libanotis* is a native of Britain. The plants thrive in ordinary soil, and may be increased by seeds.

**S. dichotomum** (dichotomous). *fl.* white; involucre wanting. June and July. *l.* pinnate; leaflets multifid, the segments linear. Stem terete, erect, clothed with fine down; lower branches short. *h.* 1 ft. to 2 ft. Tauria, 1818. Perennial. (B. M. 2073.)

**S. gummiferum** (gum-bearing). *fl.* white, tinged with pink; involucre of few leaflets, rarely wanting; umbel twenty-rayed. July to September. *l.* tripinnate, glaucous; leaflets cuneate, trifid. Stem thick, stiff, branched at top, yielding a gum when cut. *h.* 3 ft. to 4 ft. Tauria, 1804. A showy biennial. (B. M. 2259.)

**SESIA.** A genus of Moths, generally called "Clearwings," in reference to the absence of scales from the greater part of the surface of the wings, which are, consequently, nearly transparent. This, together with the length and narrowness of the wings, and the form and colouring of the bodies, gives the Moths a striking re-

FIG. 480. *SESIA APIFORMIS*.

semblance to insects of the widely-different groups of Bees, Wasps, and two-winged Flies. *S. apiformis*, one of the largest British species, is very like a hornet in general appearance (see Fig. 480), and is known as the Hornet

FIG. 481. *SESIA VESPIFORMIS*.

Clearwing. Others, e.g., *S. vespiformis* (see Fig. 481) and *S. formicæformis*, are much like some of the smaller *Hymenoptera*; while others, e.g., the Currant Clearwing (*S. tipuliformis*) closely resemble slender, two-winged Flies. These resemblances probably afford protection from enemies. The larvæ live in the branches, stems, or roots of various plants, boring into the wood or pith. They become pupæ in their tunnels. The more hurtful species are the following: Red-belted Clearwing (*S. myopæformis*)—the larvæ feed, often in large numbers, in the wood of Pear-trees; the moth is black, with a bright red belt round the middle of the abdomen.

FIG. 482. LARVA OF *SESIA TIPULIFORMIS*.

Currant Clearwing (*S. tipuliformis*)—the larvæ (see Fig. 482) are common in twigs of Currants; the moth is black, with two narrow, yellow lines on the back of

#### *Sesia*—continued.

the thorax, and three narrow, yellow belts round the body, and the wings are yellowish near the tip, with black veins. Red-tipped Clearwing (*S. formicæformis*)—the larvæ feed in Willow and Osier twigs; the moth is black, with a deep red belt round the abdomen, and a broad, red tip to each fore wing. Hornet Clearwing (*S. apiformis*)—the larvæ live in wood of Poplars, each feeding for two years; the moth is much like a hornet in size and colour, being marked with brown, orange, and yellow. Willow Hornet Clearwing (*S. bembeciformis*)—the larvæ live in twigs of Willows and Osiers; the moth is much like the last-named, but the head is brown, not yellow, and there are no yellow spots on the thorax.

*Remedies* are very difficult of application, because of the concealed mode of life of the larvæ. Of course, the moths ought to be captured, when they can be found, and this is most likely to be accomplished in the early morning, soon after they crawl out of the pupa cases, and while they are resting on the tree or twig. No remedial measures can be taken while the larvæ are in the wood; and when holes are visible the moths have escaped. Badly-infested trees should be cut down and burned, to destroy the larvæ. If twigs of Currants, Osiers, or other plants liable to attack, suddenly begin to droop, they should be cut off, and the larvæ therein destroyed.

**SESLERIA** (named in honour of Leonard Sesler, an Italian physician and botanist). ORD. *Gramineæ*. A genus comprising eight species of hardy, perennial, tufted grasses, natives of Europe and Western Asia. Spikelets two to six-flowered; panicle spike-formed, often short and bluish, or slightly silvery, sometimes elongated. Leaves flat or convolute-terete. The genus, which has no horticultural interest, is represented in the British Flora by *S. cærulea*, a plant growing from 6in. to 18in. high.

**SESQUI.** A prefix which, used in Latin compounds, signifies one and a-half; e.g., *Sesquipedalis*, 1½ft.

**SESSILE.** Sitting close on the supporting body, without any stalk.

**SESUVIUM** (signification of name unknown, probably arbitrary). ORD. *Ficoideæ*. A small genus (about four species) of stove or greenhouse, erect or prostrate, branched, succulent herbs or sub-shrubs, scattered over tropical sea-shores. Flowers often flesh-coloured or purple, axillary, sessile or pedunculate, solitary, clustered, or rarely sub-cymose; calyx tube turbinate, the five lobes coloured within; petals absent; stamens five. Leaves opposite, slightly fleshy, linear or oblong; stipules none, or sometimes connate with the petiole in a stipuleform membrane. *S. Portulacastrum* and *S. repens* are both edible as potherbs, but have a rather salt taste. Two species, both greenhouse, decumbent perennials, call for description here. These thrive in any well-drained, sandy soil. Propagated freely by slightly dried cuttings, inserted in similar soil, under a glass. Water must be sparingly administered.

**S. Portulacastrum** (*Portulacastrum*). Sea Purslane; Samphire or Seaside Purslane of the West Indies. *fl.* pedicellate; calyx green outside, reddish within; stamens twenty-five to thirty. June and July. *l.* linear or lanceolate-oblong, flat. 1692. (A. B. R. 201, under name of *Aizoon canariense*.) The variety *sessile* has sessile flowers.

**S. revolutifolium** (revolute-leaved). *fl.* red and white, sessile; stamens very numerous; stigmas five or six. July and August. *l.* ovate-oblong, with revolute margins, rather glaucous, not deep green. Cuba. (B. M. 1701, under name of *S. Portulacastrum* var.)

**SETA.** A bristle or bristle-shaped body; a slender, straight prickle; a stiff hair.

**SETARIA** (from *seta*, a bristle; alluding to the involucre of bristles surrounding the spikelets). ORD. *Gramineæ*. A genus comprising about ten species of

**Setaria**—continued.

stove, greenhouse, or hardy annual, sometimes tall grasses, broadly dispersed over tropical and temperate regions. Spikelets ovate, articulated with the pedicels in a dense, cylindric, terminal panicle, as in *Panicum*, but awnless, and with stout, rough bristles at the base on one side. Leaves flat. The genus, which has no horticultural value, is represented in Britain by *S. viridis* (Bottle Grass; Green Fox-tail Grass) *S. verticillata* has become naturalised in cultivated fields.

**SETHIA.** Included under *Erythroxylon*.

**SETIFORM.** Bristle-like.

**SETIGEROUS.** Bristle-bearing.

**SETOSE.** Bristly; covered with stiff hairs.

**SETTERWORT.** A common name for *Helleborus fatidus*.

**SETULOSE.** Slightly bristly.

**SET WALL.** An old name for Valerian (*Valeriana*).

**SEVERINIA** (named after M. A. Severino, 1580-1656, Lecturer on Anatomy at Naples). ORD. *Rutaceæ*. A monotypic genus, now included, by Bentham and Hooker, under *Atalantia*. The species is a very desirable, greenhouse, evergreen shrub, requiring culture similar to *Citrus* (which see).

**S. buxifolia** (Box-leaved). *fl.* white, small, sub-sessile, solitary or disposed in small axillary glomerules; stamens ten, free. May. *l.* simple (one-foliolate), coriaceous, persistent, entire. *h.* 3 ft. China.

**SEVILLE ORANGE.** See *Citrus vulgaris*.

**SEWERZOWIA** (named in honour of the Russian traveller who first collected the plant). ORD. *Leguminosæ*. A monotypic genus, which probably should be included under *Astragalus*. The species is a hardy annual, requiring ordinary culture.

**S. turkestanica** (Turkestan). *fl.* small, in few-flowered racemes, partly concealed under a pair of stoutly-fringed bracts. Summer. *l.* impari-pinnate; leaflets six to ten pairs, small, oblongolate, retuse. *h.* 6 in. Turkestan, 1883. (*R. G.* 1883, p. 250.)

**SEX.** This term, used in Latin compounds, signifies six; *e.g.*, Sexangular, six-angled; Sexpartite, six-parted.

**SEYMERIA** (named in honour of Henry Seymour, an English naturalist). SYN. *Azelia* (of Gmelin). ORD. *Scrophularinææ*. A genus of mostly hardy, erect, branched, annual or perennial herbs; nine species are known, of which one is a native of Madagascar, and the rest are North American. Flowers yellow, in interrupted racemes or spikes; calyx campanulate, with five entire or denticulated lobes; corolla tube short and broad, the limb of five broad or oblong, spreading lobes; stamens four, sub-equal; pedicels solitary, ebracteolate. Leaves mostly opposite, cut-toothed or dissected; upper floral ones reduced to entire bracts. Two species have been introduced. Both are hardy, North American annuals, and are very pretty subjects when in flower. Seeds should be sown in a well-drained bed of rather light, rich soil.

**S. pectinata** (comb-like). *fl.*, calyx lobes linear; corolla hairy outside, especially in the bud. July. *l.* pinnately parted into rather few short or oblong-linear divisions, or the upper ones incisedly few-toothed or entire. *h.* 1 ft. 1820.

**S. tenuifolia** (sleender-leaved). *fl.* on filiform pedicels; calyx lobes bristly; corolla ½ in. long. July. *l.* ½ in. long, copiously once or twice pinnately parted. *h.* 2 ft. to 4 ft. 1730.

**SEYMOURIA.** Included under *Pelargonium* (which see).

**SHAD-BUSH.** A popular name for *Amelanchier canadensis*.

**SHADDOCK.** See *Citrus decumana*.

**SHADING.** Throughout the summer months, nearly all indoor plants are benefited by being protected from exposure to the direct rays of the sun, even if they do

**Shading**—continued.

not absolutely require Shading. Particularly is this remark applicable to stove and greenhouse plants, very few of which, unless they can be placed in the open air, are successfully grown without more or less shade under glass. As a rule, the Shading used should be sufficiently thin to allow light to pass through it, while preventing the sun's rays doing injury. A great variety of material, in various thicknesses, is procurable for Shading plants; the system of fixing thin blinds to rollers, which may be drawn up in dull weather, is one of the best. A permanent shading invariably weakens plants, because in dull weather they cannot get sufficient light. When rollers and blinds cannot be fixed because of the expense, or for other reasons, perhaps the best alternative is to thinly stipple the glass outside with whitening mixed with milk, or some oily substance, which will not readily wash off. If white should be objected to, the solution, before being applied, may be tinted with a substance known as Brunswick green; but, as Shading of this sort would be more or less permanent for a season, it should be put on very lightly. Cutting-boxes, hand-glasses, and small propagating-frames may readily be shaded with sheets of paper, which can be taken off at night and during dull weather.

**SHAGGY.** Pubescent with long, soft hairs.

**SHAKING OR QUAKING GRASS.** See *Briza media*.

**SHALLON BUSH.** A common name for *Gaultheria Shallon*.

**SHALLOT** (*Allium ascalonicum*). A hardy perennial, native of Palestine. It has been cultivated, from a very remote period, for the use of its bulbs for seasoning culinary preparations, and for pickling; the leaves are also sometimes eaten when they are young and green. Shallots may be readily propagated each year by dividing the bulbs or cloves, and planting them separately. Rich soil is desirable, but it should not be purposely manured for this crop if a piece of land is available which has been enriched during the previous year for something else. Single cloves should be planted, not deeply, in autumn or at the end of February, about 4 in. or 6 in. apart. The plants need but little attention through the summer beyond keeping the ground free from weeds. When the leaves turn yellow, about July, the bulbs may be pulled up, dried in the sun for a few days, and then stored for use, in a similar way to Onions, in any rather dry shed from which frost is merely excluded. There are two or three varieties of Shallot in cultivation. The true one has elongated bulbs, narrowed to a long point; it keeps well, and seldom runs to seed. A form or variety known as the Russian, or Large Red, has very large bulbs of a reddish-brown colour. The Jersey Shallot has larger and much rounder bulbs than the true variety; it does not keep so long, and the plants flower and produce seeds more frequently.

**SHAMROCK.** In some districts of Ireland, this name is applied to one or more species of Clover; in England, the Wood Sorrel is generally supposed to be the Shamrock.

**SHAMROCK, INDIAN.** See *Trillium*.

**SHAMROCK PEA.** See *Parochetus communis*.

**SHARD-BORNE BEETLE.** A name popularly applied to more than one of the large Beetles, whose habit it is to fly heavily along, and which are, therefore, rendered noticeable by their habits. The name is taken from the term *shard*, formerly employed to denote any hard, thin body, and therefore used for the hard wing-cases of Beetles, which, spread out in flight, help to bear the insects up in the air; hence, "Shard-borne."

**Shard-borne Beetle**—*continued*.

The Beetle to which the name is most frequently given is one known also by other names, such as Dor Beetle. Its scientific name is *Geotrupes stercorarius*, and signifies "Dung-loving Earth-digger," a name very well chosen, in

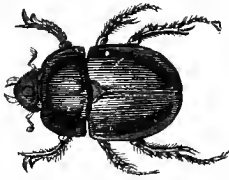


FIG. 483. SHARD-BORNE BEETLE.

allusion to the habits of the insect. The Beetle (see Fig. 483) is usually about 1 in. long, and is oblong and heavy in form. It is nearly black, or dark violet, or metallic blue or green. The wing-cases are grooved lengthwise. The Beetles are abundant throughout Britain, flying heavily and clumsily in summer evenings, and often striking against people in their flight. The females are in search of dung of cattle or of other large animals. If dung is found, the Beetles burrow through it to the ground; and there they dig "tunnels," about 1 ft. long, straight downwards. Into each tunnel they push a ball of dung, and lay an egg in the ball. The young grub is thus provided with dung as food; and in the tunnel it grows and becomes a pupa, and then a beetle, which emerges, and provides in like manner for its own progeny. All "Dung-Beetles" are harmless, if not actually useful in gardens, on account of their habits.

**SHAREWORT.** A common name for *Aster Tripolium*.

**SHEARS.** Double-bladed cutting instruments, various kinds of which are required in gardens, some for trimming hedges, others for clipping grass edgings, and others, again, for pruning. Hedge or hand Shears are in general use for cutting Holly or Yew Hedges, &c. Grass-edging Shears are provided with long handles, which workmen may use while standing in nearly an upright position: the form with a wheel attached for running along by the edge of the grass is not to be recommended in preference to the ordinary kind. Pruning Shears are made in several small sizes, for using with one hand to cut branches that are only of moderate dimensions; a form with strong handles about 3 ft. long, sometimes called Parrot-bill Shears, is one of the most useful pruning instruments for cutting branches that are too large for severing with a knife or any other kind of Shears.

**SHEATH.** A part which is rolled round a stem or other body.

**SHED.** A covered building, either inclosed or constructed with one or both of the sides open. Sheds are always very convenient storehouses in gardens; as a rule, the covered space available for keeping things dry is far too limited. Tool Shed and Potting Shed, terms in frequent use, are self-explanatory. Open Sheds usually have a wall at one side only, with the roof at the other side resting on upright pillars. These afford accommodation for keeping wheel-barrows and various tools dry, and space for storing pots and potting soils, preparing manure for Mushroom-beds, &c.

**SHEEP BERRY.** See *Viburnum Lentago*.

**SHEEP'S BEARD.** See *Urospermum*.

**SHEEP'S-BIT SCABIOUS.** A common name for *Jasione montana*.

**SHEET GLASS.** For glazing horticultural structures, this is the Glass best adapted. It may be obtained in sheets of great dimensions, for cutting up into large or small panes, as desired. Sheet Glass is made in various

**Sheet Glass**—*continued*.

thicknesses, and its value is based on the number of ounces in weight which a square foot contains. Thus 21 oz. Glass is more expensive than 16 oz., as it contains the additional weight in each square foot of its surface, and is, consequently, thicker throughout. See also **Glass**.

**SHELL-BARK HICKORY.** See *Carya alba*.

**SHELL-FLOWER.** A popular name for several species of *Alpinia* and *Chelone*, and *Moluccella laevis*.

**SHELTER.** The value of Shelter cannot be over-estimated in connection with the cultivation of somewhat tender trees and shrubs, fruit-trees, kitchen-garden crops, and flowers, and gardening generally. A site naturally sheltered is always preferable; but this is not always at command, and artificial methods of protection have to be resorted to. Especially is Shelter necessary from cold and unfavourable winds, and on the sea-coast from the prevailing winds and salt spray. Young trees and shrubs in nursery plantations may be effectually protected by planting hedges at right angles to each other, so as to form squares. These may be of Beech, Privet, Hornbeam, Thorn, Holly, or Yew, any one of which may be grown to the desired height, and kept trimmed. For sheltering valuable alpine and perennials that are not quite hardy, hand-glasses or bell-glasses are well adapted; a little dry litter or bracken may be scattered over them as well during severe frost. Small hurdles, placed on the coldest and most exposed sides, are good for protecting some of the larger specimens, also for placing over half-hardy shrubs and trees on walls. A covering of Frigidario, or any woolly material, will afford a good deal of Shelter to plants in frames during winter, and this substance, or even ordinary netting, placed over wall-fruit trees, when in flower, will often secure a crop that would otherwise be lost. Branches of Common Spruce may be used with advantage for sheltering somewhat tender trees on walls, and for such plants as Tea Roses in beds, &c. For preserving specimen plants, such as shrubs, that are not hardy, some stakes may be tied together, so as to form a sort of hood, somewhat in the shape of an extinguisher, and covered close down to the bottom with ordinary garden mats. This may be lifted on and taken off in winter, according to the state of the weather, and will be found to provide ample Shelter to the plant beneath. The necessity of providing Shelter is referred to under **Garden** and **Seaside Grounds and Plants**, and in other places where the plants described are in need of a specially-favoured situation.

**SHELVES.** Boards of various widths, but generally about 1 in. thick, used for standing plants upon in glass structures. They should be painted the same colour as the rafters and other parts of the woodwork. Shelves may either be movable or fixed to the framework of a stage, as in a greenhouse. A single Shelf along the back wall of a lean-to house, or suspended by irons from the roof, is often a valued place for growing small or medium-sized plants that need plenty of light.

**SHEPHERDIA** (named after J. Shepherd, curator of the Liverpool Botanic Garden, who died in 1836). *SYN. Leptargyria.* *ORD. Elæagnaceæ.* A small genus (three species) of ornamental, hardy, deciduous shrubs or small trees, natives of North America. Flowers dioecious, small, very shortly spicate or racemose, opposites the small bracts at the sides of the rachis. Fruit-bearing perianth baccate and persistent at base. Leaves opposite, petiolate, oblong, entire. Two of the species have been introduced. They require similar culture to **Hippophae** (which see). *S. rotundifolia*, not yet introduced to cultivation, is a handsome shrub, peculiar to the mountains of Southern Utah.

**S. argentea** (silvery). Beef Suet-tree; Rabbit Berry. *f.* yellow. April. *fr.* scarlet, edible, acid-flavoured. *l.* narrower than in

**Shepherdia**—*continued*.

*S. canadensis*, tapering at base, silvery on both sides. Tall shrub or small tree. 1820.

**S. canadensis** (Canadian). *fl.* yellowish, covered with rusty scales. *May. fr.* yellowish-red, inspid. *l.* elliptic or ovate, nearly naked and green above, beneath silvery-downy and scurfy with rusty scales. *h.* 3ft. to 6ft. 1759.

**SHEPHERD'S CLUB.** See *Verbascum Thapsus*.

**SHEPHERD'S KNOT.** A common name for *Potentilla Tormentilla*.

**SHIELD-BUDDING.** See *Budding*.

**SHIELD FLOWER.** The popular name for *Aspidistra*.

**SHIELD-SHAPED.** Round or oval and flat, with a stalk attached to the lower surface. See *Clypeate*, *Peltate*, and *Scutate*.

**SHINGLE OAK.** See *Quercus imbricaria*.

**SHOEBLACK-PLANT, or SHOE FLOWER.** A common name for *Hibiscus rosa-sinensis*.

**SHOLA OR SOLAH PLANT.** A common name for *Eschynomene aspera*.

**SHOOTING STAR.** A common name for *Dodecatheon Meadia*.

**SHOT, INDIAN.** See *Canna*.

**SHOVELS.** There are several sorts of these, all of which are found useful in gardens. Shovels are lighter than spades, and better adapted for shifting light soil, short, loose manure, sand, gravel, &c. Square-topped Shovels, having their two side edges slightly turned up, are most generally useful; those with a somewhat shield-shaped point are well adapted for shovelling gravel and stones. Stoke-hole Shovels should be made chiefly or entirely of iron, in order that they may withstand the heat to which they become subjected in stoking. The pan is best made long, and not very wide, as, when charged with coke, it may then be readily emptied into the furnace without coming into contact with the front, which is often very limited in width.

**SHRIVELLING.** A condition met with in immature fruit on plants growing in unfavourable conditions. The fruits, after being properly set, so far as can be judged from their appearance, begin to wither, and finally shrivel and fall off without ripening, so that the yield of fruit is frequently much lessened. The cause of this condition seems to be deficiency in the supply of water to the fruit, which usually shows no evidence of any disease due to parasitic Fungi or insects. Shrivelling is quite distinct from the fall of the fruit known as "Windfalls." This latter results from the presence in the fruit of insects, which eat the seeds and cause premature and imperfect ripening, with early separation from the plant. Such "Windfalls," on being cut open, will show clear traces of the cause of injury in the interior, round the seeds. The deficiency of water to which Shrivelling is ascribed may result from various causes: one of the most frequent is dryness of the soil or of the atmosphere, which causes evaporation from the green parts at a more rapid rate than that at which the roots can supply the fluid. Another cause of such deficiency is the luxuriant growth of leafy shoots on plants in sheltered, warm situations evaporation goes on from them in excess of the power of the roots to supply the full amount needed by leaves and fruits. Poor soil and insufficient nourishment have been suggested as causes.

Remedies must be selected according to the cause, which must first be carefully sought out. If the soil is poor, manure should be supplied; if it is too dry, it must be watered. Any excess in green shoots must be pruned away. Ringing the fruiting branches—*i.e.*, the removal of a narrow ring of bark from their bases—has

**Shrivelling**—*continued*.

been found very useful in diminishing the loss by Shrivelling; it tends, besides, to improve the quality of the fruit, and hastens the period of ripening. It acts by preventing the passage downwards, through the bark, of the food formed in the leaves of the branch, so that all the food is retained for the nourishment of the products of the branch itself. This method is applicable only to Dicotyledons with a distinct bark; but these include all the fruit-bearing plants of the colder temperate regions. Some plants bear the operation well; but, in general, it should only be performed as a last resort, as the branches are apt to die above the ring, or to snap off at it, and the parts below the ring do not get enough nourishment, owing to the obstacle interposed by it to the descent of the elaborated sap. The roots, too, suffer if many branches are ringed, and the whole plant is thus weakened and may die from the effects. There is also danger of parasitic Fungi or insects obtaining entrance into the tissues before the wound produced by ringing the branch has been properly healed.

**SHRUB.** A low, woody-stemmed perennial.

**SHRUBBERIES AND SHRUBS.** The term Shrubbery is usually applied to a plantation of Shrubs, although many other plants not strictly of a shrubby nature may be intermixed. Shrubs are divided into two great classes, deciduous and evergreen; both are very largely represented in gardens, but, unfortunately, with some few exceptions, they do not generally receive the attention which they deserve. In the embellishment of flower-gardens and pleasure-grounds, Shrubs play a most important part; indeed, take these away, and more than half the beauty is gone. Some are best planted in large clumps by themselves—*Rhododendrons*, for instance—although such clumps may be associated with others where any kind of grouping is attempted, or an American garden laid out.

A point of great importance which, it is to be feared, is too often overlooked, is that Shrubs which have annually to perfect their wood for flowering—be they deciduous or evergreen—should not be planted under the shade of trees: they need an open situation, and plenty of light, if proper development is to be attained. There are some evergreen subjects that do well under trees, but they are extremely few compared with those which fail to thrive under such conditions. Forest-trees should not be admitted permanently into a Shrubbery: if planted there when young, it should be with a view to subsequent removal. Trees may, however, be utilised to form a background if they are sufficiently far away to prevent their roots from robbing the soil. Mixed Shrubberies are generally arranged and planted with a view to producing an effect throughout the summer; but by making a suitable selection, and arranging with judgment, they may be rendered attractive, either in flower or foliage, throughout the whole year. As a boundary or screen dividing cultivated from wild grounds, or as a background for a mixed border in flower-gardens, evergreen Shrubs are unsurpassed. American Shrubs, when they can be obtained in quantity, are best planted in beds by themselves, or plants of very dwarf stature may appropriately form an edging for others which do not exceed some 3ft. or 4ft. in height.

An endless variety of subjects, both evergreen and deciduous, may be accommodated in a mixed Shrubbery of only moderate extent, but the planting should only be entrusted to persons having a knowledge of the different habits and dimensions which are likely to be attained. For instance, the front line should be restricted to plants that habitually remain compact, and do not grow tall, while the back part may be filled with such specimens as are of the opposite description. The centre space will then accommodate others of medium stature, and the eye will gradually pass from front to back,



**Shrubberies and Shrubs—continued.**

while the habits of the various Shrubs employed will invariably prevent an undue formality. Overcrowding is especially to be avoided, but in planting a new Shrubbery, a large number of duplicates may be inserted, with a view of treating them as being in a nursery for a year or two, and then transplanting elsewhere as the permanent specimens require additional space. Constant attention is necessary in mixed Shrubberies, to prevent each plant, particularly if it be a strong-growing one, from overgrowing its neighbour. This is a matter too often overlooked or neglected, and the consequence is that a slower-growing, but, as a rule, much more valuable, plant is either destroyed or disfigured because of the rampant growth of something else in too close proximity, as, for example, variegated Aucuba, Box, common or Portugal Laurels, or Yew. It is much better to keep all of these out of a Shrubbery, or relegate them to some back position where they may be allowed to grow and thicken without injuring the more select occupants.

Ground intended for a Shrubbery should be well trenched or deeply dug over before planting is attempted; it is then an easy matter to make holes wherever they are required, and the soil, on being dug out again, will break up finer for intermixing amongst the roots. October is the best month for the general transplanting of Shrubs, but many evergreens may be safely moved with balls at almost any season from August until the following May, except during frosty or snowy weather. The roots should not be kept out of the ground longer than is really necessary; they are nearly always active, and soon suffer if exposed and allowed to get dry.

**Summer Pruning of Shrubs.** It has been already remarked that if Shrubs in a mixed Shrubbery are to be kept within bounds, and each individual prevented from overgrowing its neighbour, constant attention in the matter of pruning is necessary throughout the summer, or at least during the growing season. Summer pruning of Shrubs is, unfortunately, too sadly neglected, when so many things are providing employment, but its advantages are none the less important, as, where it can be attended to, the results show. Shrubs usually flower on the wood made the previous year, but not always; sometimes, the blossoms appear from midsummer until autumn on the young shoots. Some knowledge of the habits and mode of flowering which the various kinds assume is therefore necessary, in order that pruning may be carried out at the proper time, and in the best manner. For instance, if a Shrub flowers naturally on wood of the previous year, and these growths are cut away in the autumn, or early the following spring, the embryo blossoms must be, as a matter of course, destroyed. Deutzias, Forsythias, Lilacs, the species of *Philadelphus*, Weigelas, and Viburnums, are examples of Shrubs such as those to which reference is made. The time to prune these, and many others of like habit, is in summer, immediately the flowers drop—that is, presuming it is attempted at all: some gardeners prefer letting such subjects grow at will, but this is scarcely allowable in the mixed Shrubbery. If the old shoots are removed as soon as the flowering is over, others will proceed from where these have been detached, and develop for the succeeding year, and the plant will not be materially enlarged in comparison with an unpruned specimen. Rhododendrons and hardy Azaleas, if they need pruning or cutting back, should receive it at a similar period—namely, as soon as the flowers fade. Many ornamental evergreen Shrubs, grown principally for their foliage, may frequently be improved by summer pruning, carried out more or less extensively, according to the position the plants occupy, and the purpose for which they are grown.

All Shrub pruning and cutting should be executed, whenever possible, with a knife, or one of the different

**Shrubberies and Shrubs—continued.**

instruments procurable for the purpose: the work may then be performed without cutting the foliage, or otherwise injuring the branches that are left. Clipping with shears is most objectionable, excepting when the Shrubs are planted as a hedge, a purpose for which Box, Holly, Privet, and Yew, are extensively employed.

**SHRUBBY PINK.** See *Dianthus fruticosus*.

**SHUTEREA.** See *Palmia bicolor*. *Hewittia bicolor* is now the correct name of this plant.

**SIBBALDIA.** Included under *Potentilla* (which see).

**SIBERIAN CRAB.** See *Pyrus prunifolia*.

**SIBERIAN PEA-TREE.** See *Caragana*.

**SIBTHORPIA** (named after John Sibthorp, 1758-1796, Professor of Botany at Oxford, and the originator of "Flora Græca"). SYN. *Disandra*. Including *Hornemannia*. ORD. *Scrophularineæ*. A genus consisting of half-a-dozen species of greenhouse or hardy, prostrate, hairy herbs, often rooting at the nodes; they are natives of Western Europe, tropical and North-western Africa, Nepal, and South America. Flowers yellow, yellowish-pink, or red, on axillary, solitary or fasciated pedicels; calyx campanulate, four to eight-cleft (often five-cleft); corolla tube short, sub-rotate; lobes of limb as many as, or one more than, the calyx lobes, spreading; stamens as many as, or one less than, the corolla lobes. Leaves alternate or fasciated, petiolate, orbicular-reniform and deeply crenate or incised-toothed. *S. europæa* (Cornish Moneywort, Pennyleaf, or Pennywort), comprised in the British Flora, is more curious than beautiful; but the variegated form is a pretty plant, well worth cultivating. The latter requires a light, well-drained soil, and should be grown in a cold frame or cool greenhouse, under a glass. Only one species—*S. peregrina*—calls for description here. It is a small, trailing, hairy, greenhouse perennial. When raised, its pendent branches and little, yellow flowers assume a very pretty appearance. It will succeed in any light, rich soil. Propagation may be effected by divisions or by cuttings, with or without a glass, in any shady situation.

**S. peregrina** (foreign). *fl.* yellow, four to five lines in diameter, five to eight parted; stamens slightly shorter than the corolla; peduncles often fasciated, 2 in. long. June. *l.* much crenated. Madeira, 1771. (B. M. 218, under name of *Disandra prostrata*.)

**SICELIUM.** A synonym of *Coccocypselum*.

**SICKLEWORT.** A common name for *Prunella vulgaris*.

**SICYOCARPUS.** A synonym of *Marsdenia* (which see).

**SICYOS** (an old Greek name, used by Theophrastus for the Cucumber; applied to this genus in allusion to the resemblance in, and affinity of, the species). ORD. *Cucurbitaceæ*. A genus comprising about a score species of half-hardy, climbing or prostrate, annual herbs, natives of the warmer parts of America, the Pacific Islands, and Australia. Flowers small or minute, monœcious. Fruit compressed or angular, rarely exceeding 1 in. in length. Leaves angular or lobed, rarely profoundly three to five-lobed. Several of the species have been introduced, but they have no value as garden plants.

**SIDA** (an old Greek name, used by Theophrastus for the Water-Lily). Indian Mallow. ORD. *Malvaceæ*. A genus comprising about eighty species of stove, greenhouse, or hardy herbs, sub-shrubs or shrubs; about eight inhabit the warmer parts of Africa and Asia, thirteen are indigenous to Australia, and the rest are American. Flowers various-coloured and sometimes showy, sessile or pedunculate, solitary or glomerate, axillary or disposed in terminal heads, spikes, or racemes; calyx five-toothed or five-cleft; petals five, hypogynous; staminal column divided into numerous filaments at the apex; bracteoles absent, or distant from the calyx. Leaves alternate.

**Sida**—continued.

Only three species call for description here. They thrive in any rich soil. *S. Napæa* may be increased by seeds; and the others by cuttings, inserted in sand, under a glass, in heat. Many plants, formerly included here, are now classed under *ibutilon*.

**S. inaequalis** (oblique-leaved). \* *fl.* on lateral peduncles about 2in. long; calyx segments ovate, acute, ferruginous, pubescent; corolla white, 2in. across when fully expanded, the petals clawed, densely glandular-pubescent outside. May. *l.* 4in. to 7in. long, slightly undulated, harshly pubescent, cordate-ovate, unequal at base, acuminate; petioles 1in. to 2in. long. *h.* 7ft. Brazil, 1829. Stove shrub. (B. M. 3436.)

**S. Napæa** (Napæa). \* *fl.* white, large, disposed in umbellate corymbs; carpels ten, pointed. Summer. *l.* five-cleft; lobes oblong, pointed, toothed. *h.* 4ft. to 10ft. North America. A tall, smooth, hardy, herbaceous perennial. (B. M. 2913.)

**S. sessiliflora** (sessile-flowered). *fl.* yellow, small, somewhat glomerate, sessile, axillary and terminal; corolla scarcely twice the length of the calyx. August to November. *l.* cordate, acute, serrated. *h.* 3ft. South America, 1827. Stove sub-shrub. (B. M. 2857.)

**SIDALCEA** (from *Sida*, and *Alcea*, an ancient Greek name, used by Dioscorides for some *Malva*; alluding to the appearance and alliances of the plants). ORD. *Malvaceæ*. A genus comprising eight species of hardy, mostly perennial herbs, with the habit of *Malva* or *Althæa*, natives of Western North America. Flowers shortly pedicellate or sessile, disposed in terminal racemes or spikes; calyx five-cleft; petals rose-purple or white; staminal column duplex at apex. Leaves mostly lobed or parted. *S. candida* and *S. malvæflora*, perhaps the only species in cultivation, require culture similar to *Malva* (which see).

**S. candida** (white). *fl.* white, in terminal racemes, freely produced. Summer. *l.* roundish, seven-lobed, glossy, long-stalked. *h.* 2ft. to 3ft. Colorado, 1882.

**S. malvæflora** (Mallow-flowered). *fl.*, corolla lilac; racemes many-flowered; pedicels twice as long as the calyx. Summer. *l.*, radical ones orbicular, loosely five to nine-lobed or incised-crenate; primary ones sub-truncate at base; cauline ones profoundly seven to nine-cleft; segments trilobed, toothed at apex, the uppermost ones entire. Stem twiggy, slender. *h.* 1½ft. Texas, 1838. (B. R. 1036, under name of *Sida malvæflora*.) SYN. *Calirhoe spicata* (R. G. 737.)

**SIDE-GRAFTING.** A method of Grafting that may be adopted for supplying a branch or stem to a tree when one is deficient; it may be practised without cutting away the head of the stock. For mode of application, see **Grafting**.

**SIDERITIS** (an old Greek name, used by Dioscorides for several plants, and derived from *sideros*, iron; so named on account of a supposed property of healing flesh-wounds inflicted by iron). Ironwort. SYNS. *Burysdorfia*, *Hesiodia*, *Marrubiastrum*. ORD. *Labiata*. A genus comprising about forty-five species of hardy or half-hardy, often woolly or softly pilose herbs, sub-shrubs, or shrubs, natives of the Mediterranean region and the Canary Islands, numerous in the Orient. Flowers often yellowish, small; calyx tubular, with five erect, usually somewhat spiny teeth; corolla tube included; limb bilabiate, the upper lip entire, emarginate, or bifid, the lower one trifid, its middle lobe much the largest; stamens four; whorls six to many-flowered, axillary or interruptedly or densely spicate. Nutslets ovoid, smooth. Leaves entire or toothed; floral ones reduced to bracts, or the lower cauline ones conformed. The species (a representative selection of which is given below) prefer a dry, sandy or chalky soil. Propagation may be effected by seeds, by cuttings, or by divisions. All have yellowish flowers, produced in summer.

**S. canariensis** (Canary Islands). *fl.*, corolla scarcely exceeding the calyx teeth, the upper lip emarginately bifid, the lower spreading; whorls twenty to thirty-flowered, sub-globose; racemes simple. *l.* ovate, crenate, cordate at base, 2in. to 4in. long, thick, wrinkled, velvety-woolly. *h.* several feet. Tenerife, 1869. Greenhouse shrub. (Ref. B. 160.)

**S. candicans** (whitish). *fl.* sub-sessile; corolla scarcely exceeding the calyx; whorls usually ten-flowered, the lower ones distant; racemes simple. *l.* ovate, slightly crenate, truncately cordate at base, thick. *h.* 3ft. Tenerife, 1714. Habit of

**Sideritis**—continued.

*S. canariensis*, but wholly clothed with white wool. Greenhouse shrub.

**S. incana** (hoary). *fl.*, calyx white-woolly; whorls distant, about six-flowered. *l.* sessile, oblong-linear, obtuse, entire, ½in. to 1½in. long, white-woolly; upper ones small, remote. Branches white-woolly or tomentose. *h.* 1ft. Spain, 1752. Half-hardy sub-shrub.

**S. perfoliata** (perfoliate-leaved). *fl.* sessile; corolla scarcely exceeding the calyx teeth; whorls all distinct, rather distant. *l.* half-amplexicaul, ovate-oblong or lanceolate, softly villous, ½in. to 2in. long; floral ones broad, spreading. Branches erect, 1ft. to 1½ft. high. South Europe, 1731. Half-hardy sub-shrub.

**S. scordioides** (Scordium-like). *fl.*, corolla yellowish, the upper lip paler or white, slightly exceeding the calyx teeth; whorls interruptedly or densely spicate; spikes 1in. to 3in. long. *l.* ovate, oblong, or oblong-linear, narrowed at base, incised-toothed; floral ones very broad, spiny-toothed. *h.* 1ft. South Europe, 1597. Hardy sub-shrub.

**S. s. alpina** (alpine). *fl.* in densely or somewhat interruptedly spicate whorls. *l.* oblong-ovate, few-toothed, cmo-villous or at length glabrous. Branches short, decumbent. Pyrenees, 1827.

**S. s. angustifolia** (narrow-leaved). *l.* oblong-linear, almost glabrous. Pyrenees, 1597.

**S. s. elongata** (elongated). *fl.* in interruptedly or rarely densely spicate whorls. *l.* oblong or oblong-lanceolate, incised-toothed, nearly glabrous. Branches elongated, ascending or erect. Spain, 1822.

**S. taurica** (Taurian). *fl.*, corolla slightly larger than the calyx. *l.* thick, oblong-lanceolate or spatulate, narrowed at base, the lower ones crenulate, densely white-woolly. *h.* 1½ft. Tauria, 1822. Hardy sub-shrub.

**SIDERODENDRON.** A synonym of *Ixora* (which see).

**SIDEROXYLOIDES.** A synonym of *Ixora* (which see).

**SIDEROXYLON** (from *sideros*, iron, and *xylon*, wood; alluding to the very hard wood furnished by the various species). SYNS. *Achras* and *Sapota* (as far as the Old World species are concerned), *Robertsia*. ORD. *Sapotaceæ*. A genus comprising nearly sixty species of stove or greenhouse, glabrous or pubescent trees or shrubs; they are broadly dispersed through the tropics, a few are found in the extra-tropical regions—South Africa, Australia, and New Zealand—and one in Madeira. Flowers usually small, sessile or pedicellate, fasciated at the nodes or axillary, five-parted; calyx segments closely imbricated; corolla broad or tubular-campanulate. Berries ovoid or globose. Leaves coriaceous, scattered. The fruits of *S. dulcificum* have a very sweet taste, and are known, with others, in West Africa, under the name of Miraculous Berry. Several of the species have been introduced, but they are of little or no value from a garden standpoint.

**SIDE-SADDLE FLOWER.** See *Sarracenia*.

**SIEBERA** (so called in honour of F. W. Sieber, of Prague, 1785-1844, a botanist who travelled in the East). SYN. *Trachymene* (of De Candolle). ORD. *Umbelliferae*. A genus comprising fourteen species of greenhouse, rigid herbs with a perennial (almost woody) stock and virgate branches, or Heath-like shrubs, glabrous or slightly glandular-pubescent, all natives of Australia. Flowers white, small; calyx teeth small, but usually conspicuous; petals entire; involueral bracts small; umbels compound or rarely simple, terminal. Leaves all entire, or the lower ones divided or all reduced to small scales, without stipules. The under-mentioned species is, perhaps, the only representative of the genus which has been introduced to English gardens, and is probably not now in cultivation. For culture, see *Trachymene*.

**S. Billardieri lanceolata** (Billardière's, lanceolate-leaved). *fl.*, involueral bracts linear; umbels compound, sessile or peduncled. *l.* lanceolate, acute, narrowed at the base, mostly above ½in. long. 1829. A shrub, either low and diffuse or erect and attaining a height of 2ft. to 3ft. (B. M. 3334, under name of *Trachymene lanceolata*.)

**SIEBERIA.** A synonym of *Habenaria* (which see).

**SIEGESBECKIA** (named in honour of John George Siegesbeck, M.D., a German botanist). ORD. *Compositæ*. A genus consisting of only a couple of species of hardy,



**Siegesbeckia**—continued.

usually annual herbs; one (including several so-called species propounded by various authors) is broadly dispersed over tropical and sub-tropical regions; the other is a native of Peru. Flower-heads yellow or white, small, paniculate, sub-radiate; involucre bracts few, herbaceous; receptacle small; achenes glabrous. Leaves opposite, often broad, toothed. Only *S. orientalis* calls for description here. Seeds should be sown on a hot-bed, in spring, and the seedlings, when strong enough, planted in the open border, at the end of May.

**S. orientalis** (Eastern). *fl.* heads yellow; outer involucral scales three or four times longer than the inner ones. August. *l.* ovate-triangular, cuneate at base, acuminate at apex, deeply toothed. *h.* 2ft. Tropics, widely dispersed, 1824. (B. R. 1061; S. B. F. G. 203, under name of *S. droseroides*.)

**SIEVERIA**. Included under **Geum** (which see).

**SIEVES**. These are in frequent demand for sifting soils intended for potting, seed-sowing, &c., also for screening cinders and gravel. What may be termed a handy set, would be one of each with  $\frac{1}{4}$  in.,  $\frac{1}{2}$  in.,  $\frac{3}{4}$  in., and 1 in. wire meshes respectively. For covering very minute seeds a small-meshed Sieve should be used, but the  $\frac{1}{4}$  in. size is fine enough for the major portion of seeds, if it is properly and carefully handled. Sieves for cleaning dry, ripe seeds are specially made for that purpose in different sizes.

**SIGILLARIA**. A synonym of **Smilacina** (which see).

**SIGMATOSTALYX** (from *sigma*, *sigmatos*, S-shaped, and *stalis*, a stake). ORD. *Orchideæ*. A genus comprising about seven species of dwarf, stove orchids, natives of tropical America. Flowers mediocre or rather small, shortly pedicellate, scattered, racemose; claw of the lip long, two-keeled; peduncles axillary under the one-leaved pseudo-bulbs. Few of the species are yet in cultivation. For culture, see **Oncidium**.

**S. malleifera** (hammer-bearing). *fl.* yellow, brown-spotted, developed at distant periods; sepals and petals ligulate-triangular, acute; lip three-parted, the divisions linear, emarginate; callus hammer-like; raceme slender. *l.* light green, cuneate-ligulate,  $\frac{5}{8}$  in. long,  $\frac{1}{4}$  in. broad. Pseudo-bulbs dark brown, oblong,  $\frac{1}{2}$  in. long,  $\frac{1}{4}$  in. broad. New Grenada, 1883.

**S. radicans** (rooting). *fl.* yellow, greenish, and violet-purple, in an elongated raceme; sepals and petals cuneate-oblong, acute; lamina of the lip transversely sagittate, one to three-lobulate; cull in one or two series. *l.* cuneate, linear-ligulate, acute, twin. Pseudo-bulbs oblong-ligulate. Rhizome radicans. Brazil.

**SIGMOID**. Somewhat resembling in form the letter S.

**SILAUS** (an old Latin name, used by Pliny to indicate some umbelliferous plant). ORD. *Umbelliferae*. A genus comprising only a couple of species of hardy, perennial, glabrous herbs, found in Europe and Russian Asia. Flowers yellowish or greenish-yellow, in compound umbels; bracts two or none. Leaves pinnately decomposed; segments slender. *S. pratensis* (Meadow or Pepper Saxifrage) is a British plant. The species are of no value from a garden standpoint.

**SILENE** (said to be derived from *sialon*, saliva; alluding to the viscid exudation on the stems and calyces of many of the species; the English name Catchfly alludes to the same peculiarity). Campion; Catchfly. ORD. *Caryophyllæ*. A very large genus (400 have been described as species, but, according to Bentham and Hooker, few more than 200 are entitled to specific rank) of greenhouse or hardy, erect, tufted, decumbent, or diffuse-climbing, annual, biennial, or perennial herbs; they are mostly natives of South Europe, North Africa, and extra-tropical Asia, about a dozen are South African, scarcely eighteen are found in North America, and eight are included in the British Flora. Flowers solitary or variously cymose, often in unilateral spikes, forming a terminal thyrses or panicle; calyx variously tubular, five-toothed or five-cleft, usually ten-nerved; petals five, with a narrow claw and an entire, bifid, or rarely lacinate lamina, often having two scales at base;

**Silene**—continued.

stamens ten; disk usually columnar. Leaves opposite, entire. Amongst *Silenes* there are a few beautiful subjects for planting on rockwork, and in the open border, and none are difficult to cultivate. They succeed in almost any light, loamy soil, and may be readily propagated by one or more of the following methods—seeds, cuttings, or divisions. *S. pendula*, and its compact variety, are plants grown extensively for spring flower gardening, a purpose for which they are admirably adapted. The seed should be sown early in the previous autumn. The species best-known to cultivation are described below. All are hardy, except where otherwise indicated.

**S. acaulis** (stemless).\* Cushion Pink; Moss Campion. *fl.* pink, rarely white,  $\frac{1}{4}$  in. in diameter; calyx tubular, with obtuse teeth; petals notched. June to August. *l.*  $\frac{1}{4}$  in. to  $\frac{1}{2}$  in. long, linear-subulate, close-set, channelled above, keeled below, ciliated. *h.* 2 in. Europe (Britain), &c. A densely-tufted perennial. (A. F. P. 79; L. B. C. 568; Sy. En. B. 205.) *alba* is a white-flowered form.

**S. alpestris** (alpine).\* *fl.* white, shining, rather large, panicked; calyx campanulately-clavate; petals with a four-toothed border and two-parted appendages. May to July. *l.* almost all radical, lanceolate, rather blunt. Stem simple, few-leaved. *h.* 6 in. Austrian Alps, 1774. Perennial. (S. B. F. G. 111.)



FIG. 484. UPPER PORTION OF PLANT AND DETACHED FLOWER OF *SILENE COMPACTA*.

**S. anglica** (English). *fl.* in leafy, racemose cymes; calyx  $\frac{1}{4}$  in. long, membranous, with pubescent ribs, the teeth setaceous; petals and scales small, entire or slightly bifid. June to October. *l.* variable; lower ones spatulate. *h.* 1ft. to 2ft. Europe (Britain), &c. An erect or diffusely-branched annual. *S. gallica* is a form with white or pink flowers and bifid petals; *S. quinquevulnera*, another variety, has entire, white petals with a red spot. (Sy. En. B. 202.)

**S. Armeria** (Armeria). Sweetwilliam Catchfly. *fl.* pink, in corymbose panicles; calyx long, clavate; petals obcordate, crowned. July to September. *l.* ovate-lanceolate, rather cordate at base. Stem branched. *h.* 1ft. to 1ft. France and Switzerland (naturalised in Britain). A smooth annual. (Sy. En. B. 204.)

**S. Atocion** (Atocion).\* *fl.* pink, in fastigiate, trichotomous panicles; calyx long, clavate; petals obcordate, obtuse, with an acute tooth on each side at the base, crowned by two

**Silene—continued.**

- protuberances. June and July. *l.* roundish-obovate; lower ones on long footstalks; uppermost ones sessile. *h.* 6in. to 12in. Stem branched, pubescent. Levant, 1781. Annual.
- S. chloroefolia** (Chloro-leaved). *fl.* white, turning reddish as they fade, large, in a terminal panicle; calyx long, striped; petals cloven half-way down, with a two-lobed crest. August and September. *l.* elliptical, pointed; upper ones rather cordate. Stems branched. *h.* 1ft. to 2ft. Armenia, 1796. A smooth perennial. (B. M. 807; B. R. 1989; S. B. F. G. ser. ii. 265.)
- S. compacta** (compact). *fl.* pink, crowded into dense corymbs; calyx very long, clavate; petals oboval, entire, crowned; bracts narrow, shorter than the pedicels. July. *l.* ovate-cordate, sessile; two large ones, like an involucre, near the corymb, appearing as if they were connate. Stem erect, branched. *h.* 1ft. Russia, 1823. A glabrous, glaucous biennial. See Fig. 484. (L. B. C. 1638; S. B. F. G. 64.)
- S. Elizabethæ** (Elizabethan). *fl.* 1½in. in diameter; calyx margined with purple; petals bright rose-colour, the claws white below, the blade cuneate-fabellate, emarginate; panicle terminal, dichotomous. July. *l.* lanceolate, acute spreading; lower ones 2in. to 3in. long, becoming gradually smaller upwards. Stems tufted, erect or ascending, and, as well as the leaves, viscid-pubescent. *h.* 9in. or more. Italy, 1833. Perennial. (B. M. 5400; R. G. 1009, 2.)
- S. fimbriata** (fringed-petaled). *fl.* white, in large, spreading panicles; calyx greatly inflated, with broad teeth; petals fringed, incurved after flowering. May to August. *l.* large, ovate-lanceolate, undulated, on long footstalks. *h.* 2ft. to 4ft. Caucasus, 1803. A pubescent perennial. (B. M. 908.)
- S. gallica** (French). A variety of *S. anglica*.
- S. Hookeri** (Hooker's). *fl.* 2in. to 2½in. in diameter, solitary in the axils, or sometimes obscurely cymose; calyx lin. long; petals pale pink, 2in. long, the lobes very variable, narrow or broad, equal, or the outer ones smaller or reduced to teeth, the two parallel white ridges on the claw terminating in white teeth at the blade. May. *l.* 2in. to 3in. long; lower ones elliptic-spathulate, narrowed into long petioles; the rest elliptic-lanceolate, acute or acuminate; all pubescent. Stems many, decumbent. California, 1873. Perennial. (B. M. 6051; F. d. S. 2093.)
- S. inflata** (swollen). Bladder Campion or Catchfly; Cow Bell; White Ben. *fl.* white, 3in. in diameter, drooping; petals deeply cloven; panicle many-flowered. June to August. *fr.*, capsule globose. *l.* 1in. to 3in. long, variable, ovate, obovate, or oblong. *h.* 2ft. to 3ft. Europe (Britain), &c. A branched, glaucous, glabrous, or downy perennial. This species may be used as a substitute for asparagus or green peas, the young shoots having the flavour of both. (Sy. En. B. 199.) *puberula* is a rarer form, with downy leaves.
- S. lacera** (torn-petaled). *fl.* white; calyx much inflated; petals jagged, with the appendages two-parted. May to August. *l.* ovate-lanceolate, undulated, on long footstalks. Caucasus, 1818. A procumbent, hispid biennial. (B. M. 2255.)
- S. lacinjata** (jagged-petaled). *fl.* crimson, with a white, two-parted crest, very large, terminal, rather drooping; calyx cylindrically ventricose; petals somewhat four-cleft; peduncles one-flowered. June and July. *l.* large, lanceolate, acute. Stem erect, branched. *h.* 3ft. to 4ft. Mexico and California, 1823. A half-hardy, pubescent perennial. (B. R. 1444; P. M. B. 267.)
- S. livida** (livid). *fl.* livid-green on the under surface, white above, panicle, drooping to one side; petals two-cleft, crowned. June and July. *l.* oblong-lanceolate. Stem flexuous, inflexed. *h.* 1ft. Carniola, 1816. A pubescent perennial.
- S. maritima** (maritime). *fl.* white; petals shortly cleft, the segments broad, with two scales at the base. June to August. Europe (Britain). A diffuse perennial. Otherwise resembling *S. inflata*. (Sy. En. B. 200.) *flore-plena* is a garden form, with double flowers.
- S. noctiflora** (night-flowering). *fl.* erect, few; calyx narrow, 1in. long; petals rose within, yellow outside, two-cleft. July and August. *l.* 3in. to 4in. long, oblong-lanceolate, acute, the lower ones petioled. *h.* 1ft. to 2ft. Europe (Britain), &c. An erect, simple or dichotomous, softly pubescent annual, viscid above. The flowers open at night, and are very fragrant. (Sy. En. B. 209.)
- S. nutans** (nodding). Nottingham Catchfly. *fl.* white or pink, in panicle or sub-racemose cymes, drooping, fragrant at night; calyx purple-nerved, with acute teeth; petals two-parted, the segments diverging. May to July. *l.* radical ones oblong-lanceolate, 2in. to 5in. long, tufted, petioled; cauline ones small, narrow, sessile. Stem viscid above. *h.* 2ft. to 3ft. Europe (Britain), &c. A pubescent perennial, with a woody rootstock. (Sy. En. B. 207.) SYN. *S. paradoxa*.
- S. ornata** (ornamented). *fl.* dark purple, panicle; calyx cylindrical, with alternate stripes and veins; petals two-parted, with broad, crowned lobes. May to September. *l.* lanceolate, rather blunt. Stems erect, branched. *h.* 2ft. Cape of Good Hope, 1775. A pubescent, greenhouse biennial. (B. M. 382.)
- S. paradoxa** (paradoxical). A synonym of *S. nutans*.
- S. pendula** (pendulous-flowered). *fl.* flesh-coloured, axillary, pendulous; calyx inflated; petals bifid, crowned. May to

**Silene—continued.**

- August. *l.* ovate-lanceolate. Italy, &c., 1731. A pubescent, branched, trailing annual. (B. M. 114.)
- S. p. compacta** (compact). *fl.* A very dwarf, compact variety, forming dense cushions, 2in. to 3in. high and 9in. to 12in. in diameter, entirely covered with bright pink flowers. This is a charming plant, extensively used for spring bedding. (P. M. n. s. 84.)
- S. pennsylvanica** (Pennsylvanian). *fl.* American Wild Pink. *fl.* pink, clustered, short-stalked; calyx club-shaped; petals cuneiform, slightly notched and arose. April to June. *l.* radical ones narrowly spatulate, nearly glabrous, tapering into hairy petioles; cauline ones two or three pairs, lanceolate. Stems 4in. to 8in. high. North America, 1806. A pubescent perennial. (B. R. 247; L. B. C. 41.)
- S. picta** (painted). *fl.* pink, loosely panicle; calyx clavate, striped with red; petals reticulated with red nerves and veins. June to August. *l.* lower ones ovate-spathulate; upper ones linear, acute. Stems much-branched, scarcely pubescent. *h.* 1ft. to 2ft. Asia Minor and Syria, 1817. A beautiful, Rush-like annual. (S. B. F. G. 92.)
- S. quinquevulnera** (five-spotted). A variety of *S. anglica*.
- S. regia**. Royal Catchfly. *fl.* deep scarlet, numerous, short-stalked, in clusters, forming a strict panicle; petals spatulate-lanceolate, mostly undivided. July. *l.* rather thick, ovate-lanceolate, acute. Stem roughish, erect, 3ft. to 4ft. high. Southern United States, 1811. A pubescent perennial. (B. M. 1724; S. B. F. G. ser. ii. 313.)
- S. Saxifraga** (Saxifraga). *fl.* terminal, solitary, rarely axillary; calyx clavate; petals yellowish on the upper surface, reddish-brown beneath; peduncles very long. June to August. *l.* linear, acute. *h.* 3in. to 6in. South Europe, &c., 1640. A smooth, rather viscid, tufted perennial. (L. B. C. 454.)
- S. Schafta** (Schafta). *fl.* purple, erect; calyx more than lin. long, clavate; petals cuneate, denticulate; peduncles bearing one or two flowers. June to October. *l.* obovate, acute. Stems many, very simple, ascending; root woody. *h.* not more than 6in. Persia, 1844. A beautiful little perennial; the branches gradually become covered with blossoms. (B. R. 1846, 20; J. H. S. i. 69.)
- S. speciosa** (showy). *fl.* scarlet, axillary or terminal, paniculate; calyx elongated-tubular, villous; petals five, oblong, spreading, four-parted, the middle segments much longer, the lateral ones reduced to teeth. June. *l.* opposite, sessile, lanceolate, somewhat obtuse. *h.* 1ft. 1843. A villous, greenhouse perennial; probably a hybrid. (F. d. S. ii. 8; P. M. B. x. 219.)
- S. supina** (supine). *fl.* white, on short, alternate pedicels; calyx long, cylindrically clavate, tomentose; petals with long claws, bifid, crowned. June to August. *l.* linear, acute. Stems woody, procumbent, branched. Caucasus, 1804. A tufted, clammy-pubescent perennial. (B. M. 1597.)
- S. vespertina** (evening). *fl.* rose-coloured, in second racemes; calyx bladder-clavate; petals two-parted, the lobes obtuse. June and July. *l.* spatulate, acute, on ciliated petioles. Stems branched, diffuse or decumbent. *h.* 1ft. Greece, &c., 1796. A beautiful, pubescent annual. (B. M. 677; S. B. F. G. 58; S. F. G. 409.)
- S. virginica** (Virginian). *fl.* Fire Pink. *fl.* deep crimson, few, and loosely cymose, peduncled; calyx oblong-cylindrical, soon obconical; petals oblong, two-cleft. June to August. *l.* thin, spatulate, or the upper ones oblong-lanceolate. Stems slender, 1ft. to 2ft. high. North America, 1783. A pubescent perennial. (B. M. 3342; R. G. 1116.)

**SILENOPSIS.** Included under *Lychnis*.

**SILICA.** A very abundant mineral in the soil, both in the pure state, and in combination with various elements forming Silicates. Pure Silica is made up of the two elements Silicon, or Silicium, and Oxygen, in the proportion of twenty-eight parts, by weight, of the former to thirty-two of the latter. It occurs in several conditions, of which the most frequent are quartz and flint, and the less common rock-crystal and caledony. Amethyst and cornelian are forms of Silica, tinged red with iron oxides. Silica, in the form of quartz, is the chief ingredient of all sands and sandstones, as well as of granites and other minerals of the same general structure; and veins or masses of pure quartz of considerable size also exist. But almost more plentiful than Silica are the Silicates, chiefly of Potassium, Sodium, Calcium, and Magnesium. These are familiar to everyone as clay, mica, felspar, and other substances that make up the mass of most soils.

Silica is not soluble in pure water; but a little Carbonic Acid gas, dissolved in the water, permits of a little Silica being dissolved; and almost all water that gains

**Silica**—continued.

access to the roots of plants contains an appreciable amount of Silica, either pure or, more frequently, combined with alkalies. Silica exhibits the properties of a weak acid, in its power of combining with various metals. It combines with these, in more than one proportion, certain compounds, called normal or basic Silicates, containing a larger proportion of the alkali than do the others. These normal Silicates are the ones that dissolve in water.

Silicates (especially normal Potassic Silicates) pass into the root-hairs of the plants from the soil, dissolved in the water absorbed by the hairs, and are then carried up the stems, as described under **Sap**. They are easily broken up by the acids formed in plants during growth, e.g., Oxalic and Citric Acid, &c. the metals combine with these acids to form new compounds, and the Silica is set free in the cell-sap; but, not being so soluble as the Silicates, it is mostly added to the walls of the cells, and is peculiarly often found in the layer or cuticle on the outer surface of the stems or leaves. In some plants, this layer is so strong and continuous that all the vegetable substance may be destroyed by means of Nitric Acid, or by burning on platinum-foil over a spirit-lamp, without destroying the continuity and markings of the cuticle, which even extends over the hairs. Such a deposit of Silica in the epidermis is well shown in many grasses, and still better in the Horsetails or *Equiseta*; but it is met with also in many other plants, e.g., in *Deutzia scabra*, where it forms a beautiful object when all the vegetable matter in the cuticle has been destroyed.

The use of Silica to plants is very doubtful. It is present in the ash of almost all plants. In many it is so abundant as to seem of much importance to them; yet the results of experiments on growing plants in artificial soils from which it is almost absent, tend to the conclusion that the growth of plants is not greatly interfered with even when the supply of Silica taken in by them is far below that usually present in them. For example, the straw of grasses is usually very rich in Silica (frequently to the amount of one-half of the ash) when grown in ordinary soils; yet grasses grown in artificial soils, from which it has been excluded as completely as possible, and whose ash, in consequence, contains less than 1 per cent. of Silica, prove as healthy and vigorous in every way as if they had been grown in ordinary soils. Probably, a large proportion of the Silica is absorbed in the form of alkaline Silicates, as mentioned above; and the Silica remains as a deposit in the cell walls after the alkalies have been made use of in the nutrition of the plants. It has been suggested that Silica may be of service in two ways, viz., in giving strength and rigidity to the stems, and in rendering the cuticle harder, so that when spores of parasitic Fungi fall upon it, and begin to germinate, the mycelium tubes find greater difficulty in piercing into the tissues of the plants. The Silica in the cuticle may thus be a defence against diseases from this cause, but, necessarily, against only such Fungi as bore through the cuticle into the inner tissues, and not against those which push in their mycelium through stomata.

**SILICATES.** See **Silica**.

**SILICLE.** A silique as broad as it is long, or broader.

**SILICULOSA.** A Linnean artificial order of the class *Tetradynamia*, having silicle-like pods.

**SILIQUA.** The long, pod-like fruit of *Cruciferae*. It consists of a pair of valves applied to a frame on which the seeds grow.

**SILIQUOSA.** A Linnean artificial order of *Tetradynamia*, having siliqueous fruit.

**SILK-COTTON TREE.** A common name for the genera *Bombax* and *Eriodendron*.

**SILKEN SISSY.** An old name for *Asclepias*.

**SILK-TREE.** A common name for *Albizia Julibrissin*.

**SILK VINE.** A common name for *Periploca græca*.

**SILKWOOD-TREE.** A name applied to *Muntingia Calabura*.

**SILKY.** See **Sericeous**.

**SILKY OAK.** A popular name for *Grevillea robusta*.

**SILPHA.** A genus of Beetles, the larvæ of which usually feed in the rotting bodies of animals, and are especially numerous in dead moles, birds, and other so-called "vermin," hung up as scarecrows. The insects of this genus are, for the most part, considerably depressed or flattened from above downwards, oval in outline, about  $\frac{1}{2}$  in. or  $\frac{3}{4}$  in. long, with a small head, and furrowed wing-cases. They are almost entirely black, or brown-black, with a dull yellowish, downy coating, which is easily rubbed off. The grubs are more slender in form than the adult insects, and all the rings, except the three next the head, have the edges sharp, and prolonged forward into a tooth, and the tail ends in two sharp points. They are usually entirely black, or black with a narrow, tawny border. They are active in their habits, running about by means of three pairs of short but well-formed legs, situated on the front part of the body. When full-fed, they form cocoons in the soil, in which they become pupæ, and in due time beetles. As long ago as 1844, larvæ of a *Silpha* were found feeding on Beets, in France; and in the same year they proved seriously injurious to Mangel-Wurzel crops near Londonderry, in Ireland. They devoured the young leaves almost as soon as the latter appeared, till only the larger ribs remained, and the plants, in consequence, died off largely. Mangel-Wurzel and Beets alone suffered; and such crops as Oats, Wheat, Potatoes, and Turnips escaped unharmed in fields where the former plants were entirely destroyed. From larvæ feeding on Beets, in France, there were reared beetles belonging to the species *S. opaca*, known as the Beet Carrion Beetle; and the same insect was also identified as the culprit in Ireland. It is rather under  $\frac{1}{2}$  in. long, flattened, and brownish-black, with the tip of the body dull red. There are three ridges down each wing-case. This beetle had long been known to frequent dead bodies of animals. It is probable that other species of *Silpha* also injure Beets and other garden produce.

**Treatment.** For the sake of prevention, only manure free from such substances (e.g., offal) as might attract the beetles should be used for ground on which Beets and Mangel-Wurzel are to be grown. Should the plants be attacked, dressings of gas-lime and of sulphur or soot, scattered over the wet leaves in dewy mornings, would probably be of service in checking the evil, as would also be paraffin dressings. All methods of strengthening the plants and promoting the growth of new leaves are of great importance, and manures may enable the crops to pass through an attack without serious results. But should the attack prove fatal, it will be well to utilise the ground for some other crop, which may be sown or planted with safety in the infested soil immediately after the removal of the Beets or Mangolds.

**SILPHIUM** (*Silphion*, the ancient Greek name used by Hippocrates for a plant which produced some gum-resin, perhaps asafetida, and which was transferred by Linnæus to this genus). Rosin-plant. **ORD. Compositæ.** A genus consisting of eleven species of tall, coarse, hardy, perennial herbs, with a copious resinous juice, confined to North America. Flower-heads yellow, large, corymbose-panicled; involucre broad and rather flat the scales imbricated in many rows; ray florets numerous, fertile; disk florets sterile; achenes glabrous, surrounded by a wing, which is notched at the top. Leaves alternate,

**Silphium**—*continued*.

opposite, or whorled, entire, toothed, or lobed. The best-known species are described below. Dr. Asa Gray says of *S. laciniatum*: "On the wide, open prairies the leaves are said to present their faces uniformly north and south, whence it is called the Compass-plant"; this peculiarity, according to other authorities, is more noticeable in young specimens. Any ordinary soil is suitable for the culture of these plants, which are best placed at the backs of flower-beds. They may be increased by division.



FIG. 485. INFLORESCENCE AND LEAF OF SILPHIUM LACINIATUM.

**S. laciniatum** (torn).\* Compass Plant; Pilot Weed; Polar Plant. *fl.*-heads few, lin. to 2in. broad, somewhat racemose; involucre scales rigidly pointed; achenes broadly winged. July. *l.* pinnatifid, petioled but dilating and clasping at base, the lower and radical ones ovate, 1ft. to 2½ft. long; divisions lanceolate or linear, acute, cut-lobed or pinnatifid, rarely entire. *h.* 3ft. to 6ft. Plant rough-bristly. See Fig. 485. (B. M. 6534.)

**S. perfoliatum** (perfoliate-leaved). *fl.*-heads corymbose; achenes winged and variously notched. July. *l.* entire, ovate, 6in. to 15in. long, coarsely toothed, the upper ones united by their bases, and forming a cup-shaped disk, the lower ones abruptly narrowed into winged petioles, which are connate by their bases. Stem 4in. to 8in. high, square. (B. M. 3354.)

**S. terebinthinaceum** (terebinthine). Prairie Dock. *fl.*-heads small; involucre scales roundish, obtuse, smooth; achenes narrowly-winged. July to September. *l.* ovate and ovate-oblong,

**Silphium**—*continued*.

somewhat cordate, serrate-toothed, rough, especially beneath, 1ft. to 2ft. long, on slender petioles. Stem smooth, 4ft. to 10ft. high, panicle at the summit, and bearing many heads. (B. M. 3325.)

**S. trifoliatum** (three-leaved). *fl.*-heads loosely paniculate; achenes rather broadly winged. August. *l.*, cauline ones lanceolate, pointed, entire or scarcely serrate, rough, short-petioled, in whorls of three or four, the uppermost ones opposite. Stem smooth, rather slender, 4ft. to 6ft. high, branched above. (B. M. 3355.)

**SILVER BELL TREE.** See **Halesia**.

**SILVER BERRY.** The fruit of *Elæagnus argentea*.

**SILVER BRACTS.** A common name for *Cotyledon Pachyphytum*.

**SILVER BUSH.** A common name for *Anthyllis Barba-Jovis*.

**SILVER CEDAR.** See *Juniperus virginiana glauca*.

**SILVER FIR.** The popular name for *Abies pectinata*.

**SILVER-GRAIN.** The glittering plates, in exogenous wood, caused by the division of the medullary rays.

**SILVER ROD.** A common name for *Asphodelus ramosus*.

**SILVER - TREE.** See *Leucadendron argenteum*. The name is also applied to *Elæagnus*.

**SILVER WEED.** See *Argyrea*. The name is also used for *Potentilla Anserina*.

**SILVER Y MOTH.** See *Plusia*.

**SILYBUM** (an old Greek name, applied by Dioscorides to some Thistle-like plants). ORD. *Compositæ*. A monotypic genus. The species is a glabrous, erect, biennial herb, included, in some books, under *Carduus*. "The specific name, *Marianum*, was given to this plant to preserve the legend that the white stain on the leaves was caused by the falling of a drop of the Virgin Mary's milk" (Lindley). The plant was formerly cultivated for culinary purposes, the root being boiled as a potherb, the heads treated like those of Artichokes, and the leaves used as a spring salad. It occurs in waste places, near gardens, &c., but is not indigenous to Britain. Any ordinary soil is suitable for its culture. Propagated by seeds.

**S. Marianum** (St. Mary's).\* Blessed, Holy, or Our Lady's Milk Thistle. *fl.*-heads rose-purple, globose, 1in. to 2in. in diameter; involucre bracts coriaceous, closely appressed, with one very stout, terminal spine; receptacle fleshy, hairy, not pitted. July to September. *l.* large, alternate, sinuately lobed or pinnatifid, white-spotted above; teeth or lobes spiny. *h.* 1ft. to 4ft. South Europe, &c. (Sy. En. B. 681.)

**SIMABA** (the native name in Guiana of one of the species). SYN. *Zwingera*. ORD. *Simarubæ*. A genus comprising about fourteen species of stove, evergreen or deciduous trees or shrubs, natives of South America. Flowers small or rather large; calyx small, four or five-lobed; petals four or five, longer than the calyx, spreading, valvate; disk narrow, erect; stamens eight to ten, included; panicles loose-flowered, short or elongated. Carpels one to five, drupaceous, the endocarp usually hard. Leaves alternate, impari- or abruptly pinnate, rarely one to three-foliate; leaflets entire, coriaceous. Three species have been introduced, but *S. Cedron* is probably the only one now known in cultivation in this country. This is a small tree, remarkable for the febrifugal properties of its seeds, which have also been, from time immemorial, reputed, in its native place, as a remedy for snake-bites. It thrives in well-drained, turfy loam. Propagated by cuttings of the ripened wood, inserted in sand, under a glass, in heat; or by imported seeds.

**S. Cedron.** Cedron-tree. *fl.* disposed in racemes 3ft. to 4ft. long. May. *fr.* about the size of a swan's egg, one-seeded, four of the cells being barren. *l.* large, pinnate; leaflets twenty or more, narrow-elliptic, livid-green above, paler beneath. Trunk simple, erect, slender. *h.* 20ft. New Granada, 1846.



FIG. 486. SIMPLE LEAF.

**SIMAROUBA** (the Carib name of *S. amara*). Frequently spelt *Simaruba*. Bitter-wood. ORD. *Simarubaceæ*. A small genus (three species) of stove, evergreen trees natives of Eastern tropical America. Flowers sub-cymose, in axillary and terminal, elongated, branched panicles; calyx small, five-lobed; petals five, spreading at the tips, imbricated. Leaves alternate, abruptly pinnate; leaflets alternate, entire, coriaceous. Probably, the only species grown in this country is *S. amara*, which yields the drug known as Simaruba-bark. For culture, see *Quassia* (to which the genus is allied).

**S. amara** (bitter). Bitter or Mountain Damson; Stavewood. fl. yellowish-white; petals spreading; panicle exceeded by the leaves. May. l. oblong or lanceolate-oblong, mucronate, with a bluntish point, green on both sides; leaflets quite glabrous or pubescent beneath. h. (under cultivation) 10ft. West Indies, &c., 1789. (B. M. Pl. 56.) SYN. *S. officinalis*.

**S. officinalis** (official). A synonym of *S. amara*.

**SIMARUBA**. See *Simarouba*.

**SIMARUBEÆ**. A natural order of scentless shrubs or trees, often small, mostly inhabiting tropical and warm regions. Flowers diclinous or polygamous, rarely hermaphrodite, regular, usually small; calyx three to five-lobed or parted; petals three to five, very rarely wanting, imbricated or valvate; stamens inserted at the base of a hypogynous disk, as many, or twice as many, as the petals, rarely indefinite; inflorescence usually axillary, paniculate or racemose, rarely spicate or a solitary flower. Fruit a drupe, capsule, or samara. Leaves alternate or rarely opposite, pinnate, rarely one to three-foliolate or simple, not dotted, very rarely glandular; stipules wanting. Bark often bitter, sometimes very much so. The *Simaruba* of the druggist is yielded by the bark and trunk of *Simarouba amara* and *S. guianensis*. *Balanites aegyptiaca* bears drupes which, when old, are edible. The order comprises thirty-one genera, and about 112 species. Examples: *Balanites*, *Quassia*, *Simaba*, *Simarouba*.

**SIMETHIS** (so named after the nymph Simethis, the mistress of Acis). SYNS. *Morgagnia*, *Pogonella*. ORD. *Liliaceæ*. A monotypic genus. The species is a slender, hardy, perennial herb, with a root of fascicled fibres. It is found at Bournemouth, and at Derrynane, in Ireland, but is only an alien or a denizen. A compost of heath mould and sand is most suitable. The plant may be multiplied by division.

**S. bicolor** (two-coloured). fl. 3in. in diameter, corymbose, jointed on the pedicel; perianth spreading, the segments white inside, purple on the back; scape paniced, as long as the leaves, bracteate. June. l. 6in. to 18in. long, 4in. in diameter, recurved, surrounded at base with torn, fibrous, brown sheaths. Europe, North-west Africa. (Sy. En. B. 1541.) SYN. *S. planifolia*.

**S. planifolia** (flat-leaved). A synonym of *S. bicolor*.

**SIMMONDSIA** (named in memory of T. W. Simmonds, botanist and explorer, who accompanied Lord Seaforth to the West Indies, and who died in 1805). SYN. *Brocchia*. ORD. *Euphorbiaceæ*. A monotypic genus. The species is a small, hardy, evergreen, much-branched shrub. A compost of rich, light loam, and a little peat, is best suited to its requirements. Propagation may be effected by cuttings.

**S. californica** (Californian). fl. green, diocious, apetalous, inconspicuous; males in sub-globose, sessile or very shortly pedun-

**Simmondsia**—continued.

culate clusters, solitary or sessile beneath a small bract; females solitary, on short and usually nodding pedicels. Mature nuts resembling an acorn in size and shape. l. opposite, sub-sessile, entire, coriaceous, pinniveined. California.

**SIMPLE**. Consisting of not more than one distinct part; e.g., a Simple leaf has one blade (see Fig. 486).

**SIMPLER'S JOY**. See *Verbena officinalis*.

**SINAPIS** (from the old Greek *Sinapi*, used by Theophrastus for Mustard). ORD. *Crucifereæ*. A small genus of European and Asiatic herbs, frequently cultivated, now included, by Bentham and Hooker, under *Brassica*. Calyx of four spreading sepals. Pods sessile, slightly terete or tetragonal; seeds globose. *S. alba* yields the white, and *S. nigra* the black, mustard. Both species are indigenous in this country, but are nevertheless largely cultivated. The seedlings or cotyledons of *S. nigra*, together with those of *Lepidium sativum*, form the salad well known as Mustard and Cress. Oil is obtained from several plants of this genus. The seeds of *S. arvensis* (the common Charlock or Corn Mustard) yield a good burning oil. Some authorities regard *S. nigra*, which, in Palestine, grows to a height of from 10ft. to 12ft., as the Mustard of Scripture, in preference to *Salvadora*. None of the species possess any horticultural value. See also *Cress* and *Mustard*.

**SINCLAIRIA**. Included under *Liabum* (which see).

**SINISTROSE**. Turned or directed to the left.

**SINNINGIA** (named in honour of William Sinning, gardener to the University of Bonn, on the Rhine). SYN. *Gloxinia* (many cultivated species). Including *Biglandularia*, *Ligeria*, *Rosanovia*, *Stenogastra*, and *Tapeionites*. ORD. *Gesneraceæ*. A genus comprising about sixteen species of very pretty, usually dwarf, pubescent or villous, stove herbs, natives of Brazil. Flowers showy, rarely rather small, solitary or fascicled in the axils, on short or long pedicels; calyx tube short and broadly turbinate, the limb leafy, deeply five-cleft or five-parted; corolla tube sub-equal at base or gibbous at back, elongated, broadly cylindrical or campanulate, the limb of five broad, spreading lobes; stamens included. Leaves opposite, often ample, long-stalked; floral ones reduced to bracts. Stems rising from a tuberous rhizome, simple or scarcely branched, sometimes almost wanting. The species best known to cultivation are described below. They require similar treatment to *Gloxinia* (which see).

**S. barbata** (bearded). fl., calyx nearly lin. deep; corolla white, with red marks inside, much swollen at base, contracted at throat, hairy, 1 1/2 in. long; peduncles 1/2 in. to 1 1/2 in. long, axillary, solitary or twin. Summer. l. oblong or oblong-lanceolate, a few inches to nearly 1ft. long, attenuated at both ends, acute, crenate-serrate, pilose above, crimson beneath; petioles 1/2 in. to 1 1/2 in. long. Stem decumbent or ascending. 1867. (B. M. 5623; F. d. S. 1847; F. M. 356, under name of *Tapeionites Carolinae*.) The variety *major* (l. H. n. s. 506) only differs from the type in its larger proportions.

**S. concinna** (neat). fl., calyx rather small, the segments much longer than the tube; corolla lurid-purple above, yellowish beneath, spotted within, nearly lin. long, the tube much dilated towards the throat; peduncles axillary, scape-like, longer than the leaves. Summer and autumn. l. broadly round-ovate, deeply crenate, rather small. Stem 1/2 in. to lin. long, and, as well as the petioles, peduncles, and nerves, red. 1860. (B. M. 5263, under name of *Stenogastra concinna*; F. d. S. 1533 and I. H. 1864, 390, under name of *Stenogastra concinna*.) The variety *multiflora* (l. H. 1864, 390, left-hand figure, under name of *Stenogastra multiflora*) is a handsome garden plant, with larger leaves than its parent, and lilac-blue flowers.

**S. conspicua** (conspicuous). fl., calyx segments lanceolate, spreading; corolla yellow, paler within than on the inside, the lower part of the tube marked on the inside with elegant, purple lines and dots, obliquely infundibular-campanulate. Summer. l. opposite, ovate-oblong, shortly acuminate, slightly cordate at the base, dentate. Rhizome tuberous. h. 1ft. Brazil, 1868. Plant hairy, free-flowering. SYNS. *Biglandularia conspicua* and *Rosanovia conspicua* (R. G. 712). *Rosanovia ornata* (F. d. S. 2423-4) is a fine hybrid, with flowers of a pure white, lined with light rose on the tube and the two upper lobes of the corolla, the throat slightly greenish-yellow.

**Sinningia**—continued.

**S. guttata** (spotted). *fl.*, calyx narrow-campanulate; corolla pale greenish, the tube very thickly spotted with purple or fuscous dots, the upper lip of the limb slightly reccinate; peduncles shorter than the calyx, nearly equalling the petioles. June. *l.* oblong-ovate, acuminate, cuneate at base, crenate-toothed, entire at base, velvety-pubescent. Stem ascending, slender, leafy. *h.* 1½ ft. 1827. This species much resembles *S. velutina*. (B. R. 1112; P. M. B. ii. 4.)

**S. Helleri** (Heller's). *fl.*, calyx red, large, sometimes 2 in. long; corolla white, the throat greenish and spotted with red, often 3 in. long, tumid at base, the lobes of the limb broad and round; peduncles erect, scarcely 1 in. long. June. *l.* convex, ovate-oblong, 4 in. to 7 in. long, acute, mostly cuneate at base, crenate-serrate, velvety-pubescent, more or less approaching the soil; petioles (as well as the peduncles, stem, and under surface of leaves) purplish. Stem a few inches high, thick, and slightly woody. 1820. (B. R. 997; B. M. 4212, under name of *S. velutina*.)

**S. hirsuta** (hairy). *fl.*, calyx red, ½ in. long, very villous, the segments sub-erect; corolla lilac, twelve to fourteen lines long and broad, the limb dotted with violet, the lobes sub-emarginate, the tube pale pilose outside, purple-spotted within; peduncles glomerate or sub-racemose, shorter than the leaves. July. *l.* few, broadly ovate, obtuse, cordate, 3 in. to 5 in. long, deeply crenate, purplish beneath; petioles 1 in. to 1½ in. long. Stem a few inches long, prostrate, clothed with long, white villi. 1824. (B. M. 2690, B. R. 1004, and L. B. C. 1296, under name of *Gloxinia hirsuta*.)

**S. Menziesiana** (Menzies'). *fl.*, calyx large, with very long, linear-lanceolate segments, densely hairy-villous; corolla ample, the limb violet, the throat copiously dotted with red; peduncles longer than either petioles or flowers. August. *l.* ovate, obtuse, cordate, crenate, villous. Stem shortened. (B. M. 3943, under name of *Gloxinia speciosa Menziesii*.)

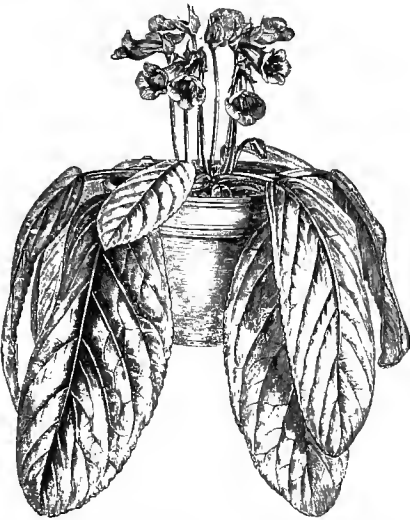


FIG. 487. SINNINGIA SPECIOSA.

**S. speciosa** (showy).\* *fl.*, calyx segments ovate-lanceolate, shortly villous; corolla usually violet in the type, ample, campanulate. September. *l.* oblong, obtuse or slightly acute, convex, usually attenuated at base, crenate, velvety and sparsely pilose. Stem short. 1815. From this species a large number of very beautiful garden varieties and hybrids have been raised, a list of which will be found under their popular name, *Gloxinia* (which see). See Fig. 487. SYNS. *Gloxinia Passinghamii* (P. M. B. xii. 267), *G. speciosa* (B. 105, 149; B. M. 1937; B. R. iii. 213, xxx. 48; L. B. C. 28), *Ligeria speciosa*. A selection of garden forms, widely differing in colour, are figured as *Gloxinias* in the following works: R. G. 1852, 4, and 1853, 44; P. M. B. xi. 199, and xv. 169; F. d. S. 1885 and 1918.

**S. s. albiflora** (white-flowered). *fl.* white. (B. M. 3206, under name of *Gloxinia speciosa albiflora*.)

**S. s. caulescens** (caulescent). *l.* larger than in the type. Stem produced, thick. 1826. (B. R. 1127 and L. B. C. 1566, under name of *Gloxinia caulescens*.)

**S. s. macrophylla** (large-leaved). *l.* very large, with white nerves. 1844. (B. M. 3934, under name of *Gloxinia speciosa macrophylla variegata*.)

**S. s. rubra** (red). *fl.* of a splendid red. (P. M. B. vii. 271, under name of *Gloxinia rubra*.)

**S. velutina** (velvety). *fl.*, calyx infundibular-campanulate, 1 in. long, with triangular segments; corolla pale greenish, 1½ in. to 2 in.

**Sinningia**—continued.

long, gibbous at base, constricted at throat, the limb spreading; peduncles shorter than the calyx. June. *l.* ovate, acute, rounded or nearly cordate at base, 2 in. to 4½ in. long, green on both sides, the nerves, as well as the stem and petioles, at length purplish, crenate-serrate, puberulous or often nearly glabrous above. Stem erect, sometimes 1½ ft. high, slender, leafy. 1827. (L. B. C. 1398.)

**S. villosa** (villous). *fl.*, calyx amply or shortly campanulate, spreading, the segments ovate and slightly acute; corolla yellowish-green, almost semi-globose, 1½ in. to 2 in. long, the limb 1 in. broad, sub-equal, spreading; peduncles shorter than the petioles. June. *l.* oblong-ovate, convex, acuminate, sometimes nearly lanceolate, 3 in. to 5 in. long, usually acute at base, crenate. Stem erect, 1½ in. or more thick. *h.* 1 ft. 1827. (B. R. 1134.)

**S. Youngiana** (Young's).\* *fl.* axillary or terminal, solitary; calyx lobes ovate, acuminate; corolla more or less intensely violet or purple, with the exception of the campanulate tube, which is yellowish-white at the base, and at the throat, which is spotted; lobes almost equal, round. Summer. *l.* opposite, petiolate, oblong or ovate, crenate, pale or almost whitish below. Stem erect, purplish, 1 ft. to 1½ ft. high. Rhizome tuberous, several inches in diameter. A hybrid between *S. speciosa* and *S. velutina*. (B. M. 4954.)



FIG. 488. SINUATE LEAF.

**SINUATE.** Having a strongly waved or recessed margin. A sinuate leaf is shown at Fig. 488.

**SINUS.** A term applied to the recesses formed when the edge of any part is lobed.

**SIPHOCAMPYLOS** (from *siphon*, a tube, and *kampylos*, curved; alluding to the form of the corolla). SYN. *Lobelia* (of Presl). ORD. *Campanulaceæ*. A large genus (nearly 100 species) of very beautiful, glabrous, hairy, or stellate-tomentose, stove or greenhouse herbs, sub-shrubs, or shrubs, sometimes climbing, natives of tropical America. Flowers red, orange, or purplish, rarely greenish, usually large; calyx tube adnate, the limb of five leafy lobes; corolla straight or incurved, the lobes often incurved, equal or unequal, sometimes bilabiate, the lateral ones sometimes connate with the upper ones; staminal tube adnate to the base of the corolla; peduncles one-flowered, ebracteate or minutely bibracteolate, axillary or forming clustered corymbs or loose racemes at the tips of the branches. Leaves alternate, rarely whorled, entire or denticulate, rarely incised-toothed or pinnately lobed or dissected. The introduced species are described below. They succeed in a light, turfy loam, and peat, and are propagated by cuttings. Except where otherwise indicated, they are herbaceous perennials.

**S. amœnus** (pleasing). A synonym of *S. villosulus*.

**S. betulæfolius** (Birch-leaved).\* *fl.* red; calyx segments six times shorter than the corolla; pedicels axillary, solitary, exceeding the leaves. July. *l.* petiolate, ovate, acuminate, sub-cordate-triangular, 2 in. long, somewhat doubly serrated, glabrous above, slenderly pubescent on the nerves beneath; petioles nearly 1 in. long. Stem branched, terete, glabrous. *h.* 3 ft. Organ Mountains, 1842. Stove. (B. M. 3973; P. M. B. ix. 223.)

**S. bicolor** (two-coloured). A garden synonym of *Lobelia laxiflora angustifolia*.

**S. canus** (hoary). A synonym of *S. macropodus*.

**S. coccineus** (scarlet).\* *fl.* scarlet, nodding; corolla dilated upwards and curved, the limb scarcely bilabiate; peduncles longer than the leaves, axillary, solitary, one-flowered. July. *l.* ovate, acute, shortly petiolate, sometimes slightly lobed, doubly serrated. *h.* 3 ft. Organ Mountains, 1844. A glabrous, stove sub-shrub. (B. M. 4178; F. d. S. ii. 9; P. M. B. xii. 173.) The variety *leucostomus* (F. d. S. 648) differs from the type in having the limb of the corolla almost white. A garden form, raised in the gardens of the King of Belgium, in 1850.



**Siphocampylos**—continued.

- S. crenatifolius** (crenate-leaved). *fl.* scarlet, tipped with yellow, axillary, solitary. Summer. *l.* oblong-elliptic, irregularly crenate, 5in. to 6in. long. *h.* 3ft. Brazil, previous to 1870. A showy, warm greenhouse shrub. (Ref. B. 227.)
- S. fimbriatus** (fringed). A synonym of *S. longepedunculatus*.
- S. fulgens** (brilliant). A synonym of *S. Humboldtianus*.
- S. giganteus** (gigantic). *fl.* reddish-yellow; corolla falcate, velvety, the tube equalling the calyx lobes, the lobes lanceolate-ovate; pedicels bibracteolate at base, often longer than the leaves. July. *l.* lanceolate, cuspidate-acuminate, 6in. to 9in. long, narrowed at base, scarcely petiolate, wrinkled, crenate-toothed, glabrous above, pilose beneath. Stem 14ft. or more in height; branches pubescent. New Grenada. Stove.
- S. glandulosus** (glandular).\* *fl.* rose-coloured, nodding; calyx lobes spreading, with reflexed margins, deeply glandular-serrate; corolla tube curved, compressed, clavate, the limb segments nearly equal, erecto-patent; peduncles axillary, solitary, shorter than the leaves, one-flowered, bibracteate below the middle. July. *l.* rather long-stalked, cordate, wrinkled, doubly toothed. *h.* 3ft. Bogota, 1845. A softly pubescent, stove plant. (B. M. 4331; F. d. S. 401.)
- S. hamatus** (hooked). *fl.* violet, in short, dense, terminal racemes; calyx lobes hooked, spreading; corolla tube curved, laterally angular-compressed, the segments nearly equal, elongated; primary bracts hooked at apex. June. *l.* alternate, petiolate, oblong-ovate or slightly cordate, acuminate, attenuated towards the base, irregularly toothed, the nerves prominent beneath. *h.* 6ft. Brazil, 1849. A tomentose-pubescent, greenhouse plant.
- S. Humboldtianus** (Humboldt's).\* *fl.* scarlet; calyx lobes ovate-triangular, shorter than the tube; corolla tube straight, the segments ovate-lanceolate, upper ones longer; pedicels axillary, compressed, equalling the leaves. Summer. *l.* petiolate, ovate or lanceolate, acute at both ends, argutely denticulate, glabrescent above. Branches angular, densely pubescent. *h.* 3ft. Peru, 1867. Stove. (B. M. 5551.) SYN. *S. fulgens* (F. M. 315).
- S. lantanifolius** (Lantana-leaved). *fl.* purplish, eight to ten together; calyx velvety; corolla narrow, incurved, with acuminate lobes; pedicels corymbose. July. *l.* ovate, acute, 1½in. long, obtuse at base, sometimes slightly cordate, shortly petiolate, glabrous and wrinkled above, fuscous-tomentose beneath, the margins denticulate. Branches straight, simple, somewhat woody, terete. *h.* 3ft. Caraccas, 1841. Stove shrub.
- S. l. glabriusculus** (slightly glabrous). *l.*, together with the pedicels and calyx, scarcely pubescent. (B. M. 4105, under name of *S. lantanifolius*.)
- S. longepedunculatus** (long-pedunculate). *fl.* purplish, on axillary pedicels longer than the leaves; calyx segments acute, much shorter than the corolla; corolla nearly 2in. long, narrow, sub-arcuate. January. *l.* alternate, ovate, acuminate, 3in. to 4in. long, membranous, cordate, petiolate, argutely toothed. Stem terete, 3ft. high. Rio de Janeiro, 1841. Stove. (B. M. 4015.) SYN. *S. fimbriatus* (R. G. 600).
- S. macropodus** (large-footed). *fl.* bluish-red; calyx hairy; corolla four times as long as the calyx, the tube ventricose above, the inferior lobes reflexed; pedicels almost equalling the leaves, puberulous. June. *l.* ovate, acute, 5in. long, shortly petiolate, crenate, slightly hairy above, pubescent beneath. Stem slightly branched, hairy, 2ft. to 3ft. high. Minas Geraes. Stove. SYN. *S. canus*.
- S. manettiaeflorus** (Manettia-flowered).\* *fl.* red and yellow, as long as the leaves; calyx segments subulate, serrate; corolla laterally compressed, the segments nearly equal, erecto-patent; peduncles solitary, axillary, one-flowered, bibracteate, three or four times longer than the leaves. April. *l.* very shortly petiolate, oblong-ovate, obscurely serrate, reticulated, shining above. *h.* 1ft. New Grenada, 1848. An erect, dwarf, stove subshrub. (B. M. 4403; P. M. B. xv. 267.) SYN. *S. nitidus* (of gardens).
- S. microstoma** (small-mouthed). *fl.* scarlet, shortly pedunculate, in terminal umbels; calyx segments obtuse, spreading; corolla pubescent, swollen above, laterally compressed, the segments small, linear, obtuse, connivent, pilose. September. *l.* alternate, shortly petiolate, ovate, acute, 2in. long, glandular-serrate, glabrous. Stem 2ft. to 3ft. high, glabrous; branches terete. New Grenada, 1844. An erect, stove subshrub. (B. M. 4286; F. d. S. 444; L. & P. F. G. ii. 44.)
- S. nitidus** (shining). A garden synonym of *S. manettiaeflorus*.
- S. Orbignianus** (d'Orbigny's). *fl.* yellow and red, numerous in the upper axils; calyx lobes thrice as long as the tube; corolla much longer than the calyx, with linear lobes; pedicels half as long as the leaves. July. *l.* ternate, ovate, acuminate, shortly petiolate, unequally and acutely toothed, 3in. to 4in. long, puberulous beneath. Branches erect, terete. *h.* 2ft. or more. Bolivia, 1849. Stove. (B. M. 4713; F. d. S. 544; L. & P. F. G. i. p. iii.; L. J. F. iv. 425.)
- S. penduliflorus** (pendulous-flowered). *fl.* scarlet, nodding; calyx segments two or three times as long as the tube; corolla segments linear, half exceeding the tube; pedicels lin. long; racemes terminal, solitary, long, loose-flowered. June. *l.* opposite, rather long-stalked, ovate-oblong, slightly acute, remotely serr-

**Siphocampylos**—continued.

- lated, rather thick. *h.* 2ft. Caraccas, 1847. A highly glabrous, stove, climbing shrub. (F. d. S. 763.)
- S. scandens** (climbing). *fl.* scarlet, scattered, on pedicels two to four lines long; corolla tube nearly 1in. long, the segments falcate, sub-equal, reflexed. July. *l.* petiolate, reflexed, oblong, obtuse, lin. to 1½in. long, somewhat acute at base, slightly fleshy, the margins quite entire and revolute. Stem climbing. Peru, 1847. Stove shrub.
- S. surinamensis** (Surinam). A synonym of *Centropogon surinamensis*.
- S. villosulus** (slightly hairy). *fl.* reddish-orange; corolla small, nearly straight, the segments narrow and acute; pedicels longer than the calyx; racemes terminal, many-flowered. June. *l.* alternate, oblong-lanceolate, acuminate, narrowed into the petiole, above silky, and of a pleasing green, very shortly puberulous beneath. Stem branched. *h.* 3ft. Brazil, 1832. Greenhouse. (F. d. S. 619; L. & P. F. G. ii. p. 135, under name of *S. amarus*.)
- SIPHONANDRA**. A synonym of **Chiococca** (which see).
- SIPHONANTHA**. A synonym of **Clerodendron** (which see).
- SIPHONIA**. A synonym of **Hevea** (which see).
- SIPHONIOPSIS**. A synonym of **Cola** (which see).

**SIPHONOPHORA**. A genus of Aphides or Greenflies, distinguished by long, slender honey-tubes or siphons, borne on the hinder part of the body (see

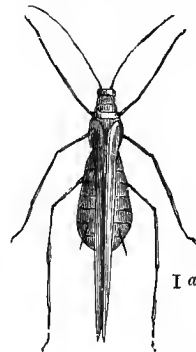


FIG. 489. SIPHONOPHORA ROSE—*a*, Line showing the natural length.

Fig. 489). It includes a very large number of species, several of them injurious to cultivated plants, e.g., Roses.

**SIREX**. A genus of Sawflies, the larva of which feed in the wood of Conifers, in which they bore tunnels, often about ½in. wide. They thus injure the trees, and ruin the wood for carpentry. Only two species are known as British; these are *S. juvenus* (the Steel-blue Sirex) and *S. gigas* (the Giant Sirex). They agree in general form. The body is nearly cylindrical. In the female, the last ring of the abdomen bears a strong spine, directed backwards; and from the lower surface of the abdomen arises a strong ovipositor, also pointed backwards, in which lies the "saw," used for boring into tree-trunks. The ovipositor is about half as long as the body. The four wings are large, powerful, and transparent. The legs and antennae are also well developed. The length, without the ovipositor, varies from about ½in. to 1½in., but is usually over 1in. The mode of life is as follows: The female bores with her saw into the bark of trees, preferring sickly ones if they are to be found, and deposits in each hole an egg, from which, after a time, a white, soft, cylindrical larva emerges. The larva tunnels in the wood of the tree. The duration of the larval stage is uncertain. Some believe that it is

**Sirex**—continued.

passed through in a few weeks; but the perfect insects have emerged at intervals for many years from wood to which the larvæ could not have got access after the trees had been felled and sawn into planks. The larvæ have strong jaws, six very small feet near the head, and a bluntly-pointed tail. They change in their tunnels into pupæ. From these the perfect insects emerge, from July to September.

*S. juvenus*, or the "Steel-blue Sirex" is, as the name denotes, usually of a dark steel-blue colour, with red-brown feet; in the males, several segments of the abdomen are rusty-red. The wings, in both sexes, are yellowish, with smoky hind margin. The females are usually 1½ in. long, the males rather below 1 in. This insect is not rare. It prefers Scotch Firs, though it also feeds in other Conifers.

*S. gigas*, or the Giant Sirex, is rather larger than the other species, from which it also differs in colour. It is ringed with black and yellow; the latter colour is duller in the males. This species is less common than the former. The larvæ are said not to attack Scotch Firs; but feed in Spruce, Silver Fir, and occasionally in Larch.

**Remedies.** It is not possible to destroy the larvæ in infested trees. To prevent the injury from spreading, sickly trees, and all fallen branches and trunks, should be cut up and removed; and this should be done also with all trees that show traces of serious injury, in the form of holes through which the insects have escaped. The timber of such trees is of little value, save as firewood, because of the injury done to it by the larvæ.

**SIRIUM.** A synonym of *Santalum* (which see).

**SISARUM.** Included under *Pimpinella*.

**SISSOO-TREE.** A common name for *Dalbergia Sissoo*.

**SISYMBRIUM** (an old Greek name, used by Theophrastus for Mint). Hedge Mustard. Including *Alliaria*. ORD. *Cruciferae*. A genus comprising eighty species of hardy, mostly annual or biennial herbs, usually inhabiting the temperate and cold regions of the Northern hemisphere, but rarely occurring in the Southern. Flowers usually yellow, rarely white or rose, loosely racemose, rarely axillary. Radical leaves stellate; cauline ones alternate. Five species are included in the British Flora: *S. Alliaria* (Garlic Mustard, Jack-by-the-Hedge, Sance Alone), *S. Irio* (London Rocket, so called because it sprang up after the Great Fire), *S. officinale* (Bank Cress, common Hedge Mustard), *S. Sophia* (Flixweed), and *S. Thaliana* (Thale Cress). The genus has no horticultural value.

**SISYRINCHIUM** (an old Greek name, used by Theophrastus for the Iris). Blue-eyed Grass; Pig Root; Rush Lily; Satin Flower. SYN. *Souza*. Some of the plants included here were formerly placed under *Bobartia*. ORD. *Iridæ*. A genus comprising about fifty species of mostly hardy or half-hardy perennials, with fibrous roots; all are natives of tropical or extra-tropical America, and one has become naturalised in Ireland. Flowers many in a spathe, pedicellate; perianth with scarcely any tube, and sub-equal, obovate or oblong lobes; stamens affixed at the base of the perianth. Leaves radical or clustered at the base of the stem, linear-terete or more or less ensiform, always narrow; cauline ones few or none. Stems equal or slightly thickened at base. A selection of the species best known in gardens is given below. All thrive in a compost of sandy loam and leaf mould. Propagation may be effected by seeds, or by offsets, in spring.

**S. anceps** (two-headed). A synonym of *S. angustifolium*.

**S. angustifolium** (narrow-leaved). *fl.* of a paler blue than in *S. Bermudiana*. *l.* narrower, and whole plant smaller. Eastern United States (naturalised in New Zealand and Australia, also in Ireland). SYNS. *S. anceps*, *S. gramineum* (B. M. 464).

**Sisyrinchium**—continued.

**S. Bermudiana** (Bermudan). This differs from *S. angustifolium* in being much larger in all its parts, and strikingly so in its broad leaves, which are equitant at the base. *h.* 1½ ft. to 2 ft. Bermudas. SYN. *S. iridioides* (B. M. 94).

**S. californicum** (Californian). *fl.* many in succession, scentless; perianth of a uniform yellow, expanate, the segments obovate-oblong, obtuse; anthers orange-coloured; fascicle many-flowered; scape quite simple, longer than the leaves, curved. Autumn. *l.* several, distichous, 1 ft. to nearly 2 ft. high, about ¼ in. broad, linear-ensiform. California, 1796. Half-hardy. SYN. *Marica californica* (B. M. 983).

**S. chilense** (Chilian). *fl.*, perianth purple, yellow at the base, three to five lines long; bracts leaf-like; spathe linear, acuminate, about three-flowered; peduncles flexuous, very slender, 1 in. to 1½ in. long. July. *l.*, radical ones linear-ensiform, striated, 3 in. to 12 in. long, one to two lines broad. Stem 6 in. to 12 in. high, flexuous. Brazil, &c., 1826. Half-hardy. (B. M. 2786.)

**S. Douglasii** (Douglas'). A synonym of *S. grandiflorum*.

**S. filifolium** (thread-leaved).\* *fl.* campanulate, erect; perianth white, like porcelain, each segment delicately lined with pale purplish-red. May. *h.* 6 in. to 8 in. Falkland Islands, 1835. Plant of Rush-like habit. (B. M. 6823; G. C. n. s., xxiii. p. 696.)

**S. gramineum** (grass-like). A synonym of *S. angustifolium*.

**S. graminifolium** (grass-leaved). *fl.* slightly exserted above the spathe; perianth yellow, the segments obovate, mucronate; spathes terminal, few or many-flowered, the outer one leafy, 1½ in. long, the inner 1 in. long. April. *l.*, radical ones 8 in. long, scabrous on the margins, acuminate, sheathing at base; cauline ones 3 in. to 6 in. long. Stem branched, erect, 7 in. to 9 in. high. Chili, 1825. Half-hardy. (B. R. 1067.)

**S. g. ascendens** (ascending). *fl.*, spathes very hairy, equal. *l.*, radical ones 4 in. to 6 in. long; cauline ones 2 in. to 3 in. long, alternate. Stem 5 in. to 9 in. high. (B. R. 1914, under name of *S. g. pumilum*.)

**S. g. maculatum** (spotted). *fl.*, perianth segments marked with dark blood-coloured spots. (B. M. 3197, under name of *S. maculatum*.)



FIG. 490. SISYRINCHIUM GRANDIFLORUM.

**S. grandiflorum** (large-flowered).\* Spring Bell. *fl.*, perianth dark purple, striated, the segments obcordate, unguiculate, eight to ten lines long; spathe two-flowered, erect, leafy, terminal, two-valved. May. *l.* erect, broadly linear, spreading, striated, 6 in. to 8 in. long, sheathing at base. Stem 8 in. to 10 in. long, quite simple. Root creeping. North America, 1826. A pretty hardy plant. See Fig. 490. (B. M. 3509; B. R. 1364; G. C. n. s., xxi. p. 216; R. H. 1868, p. 190; S. B. F. G. ser. ii. 388.) SYN. *S. Douglasii* (F. d. S. 146). There is a variety of this with white flowers.

**S. iridifolium** (Iris-leaved).\* *fl.* on slender pedicels, pubescent beneath; perianth yellowish-white, the segments about ¼ in. long, cuneate-ligulate, slightly mucronate; spathes terminal, the outer one 1½ in., the inner 1 in., long, carinate; peduncles geniculate. June. *l.* linear-ensiform, incurved at apex, scabrous-ciliated on the margins; radical ones 4 in. to 8 in. long; cauline ones 2 in. to



**Sisyrinchium**—*continued*.

4in. long. Stem branched, 4in. to 12in. high. Brazil to Chili, 1822. Half-hardy. (L. B. C. 1979.) *SYNS. S. laxum* (B. M. 2312), *Marica iridifolia* (B. R. 646).

**S. iridioides** (Iris-like). A synonym of *S. Bermudiana*.

**S. laxum** (loose). A synonym of *S. iridifolium*.

**S. lutescens** (yellowish). A synonym of *S. striatum*.

**S. micranthum** (small-flowered). *fl.* three to ten, small, pedicellate; perianth yellow,  $\frac{1}{2}$ in. long; spathes terminal, the outer one about lin., the inner  $\frac{1}{2}$ in., long. June. *l.* linear-ensiform, striated, glabrous; radical ones lin. to 4in. long, one line broad; cauline one bract-like, lin. long. Stem glabrous, one-leaved, simple, flexuous, 2in. to 9in. high. Mexico and Brazil, &c., 1815. Half-hardy. (B. M. 2116.)

**S. striatum** (striated). *fl.* nine to twelve, spicate, alternate, exceeding the ovate, cuspidate spathe; perianth yellowish, the tube two lines, the segments seven lines, long; pedicels nearly equaling the spathe. June. *l.* glabrous; radical ones about 1ft. long, distichous, equitant, sheathing; cauline ones rather remote, amplexicaul. Stem 1ft. to 2ft. high, simple or branched. Chili, 1788. Hardy. *SYNS. S. lutescens* (L. B. C. 1870), *Marica striata* (B. M. 701).

**S. tenuifolium** (slender-leaved). *fl.* perianth yellow, the segments oblong, acute; pedicels sparsely hairy, exceeding the spathe; spaths two-leaved, terminal, one or many-flowered. *l.* linear-ensiform, scarious on the margins, acuminate, striated; radical ones 2in. to 5in. long; cauline ones 2in. to 4in. long. Stem ascending, simple or branched,  $\frac{1}{2}$ in. to 12in. high. Mexico, 1816. Hardy. (B. M. 2117, 2313.)

**SITOCODIUM**. A synonym of *Camassia*.

**SITODIUM**. A synonym of *Artocarpus*.

**SITOLOBIUM**. Included under *Dicksonia* (which see).

**SITONA**. A genus of small beetles belonging to the family of Weevils. It includes those popularly known as Pea-and-Bean-Weevils, which receive this name because of the harm they do to the Pea and Bean crops, especially in field cultivation. But they also feed on many other leguminous plants, *e.g.*, Clover. In them the beak is shorter than in most Weevils, and projects horizontally. It is flat, except for a slight channel along its upper surface. The antennæ are elbowed. The body is oblong, with the thorax a good deal narrower than the abdomen. The beetles are about  $\frac{1}{2}$ in. or a little more in length. Their ground-colour is black; but this is almost always more or less concealed by a coat of ochreous, grey, or rosy scales and hairs. These scales and hairs are apt to be rubbed off, and to disappear after a time. The most hurtful species are *S. crinita*, the Spotted Pea-weevil, and *S. lineata*, the Striped Pea-weevil. The former bears ten punctured stripes down the wing-cases, these stripes being alternately dark and light ochreous. The former species is a little smaller than *S. lineata*, is more grey or rosy than that insect, and has a few dark spots on the wing-cases. Both have the limbs, for the most part, dull-red.

The beetles feed on Peas, Beans, and other leguminous plants, gnawing the young leaves and leaflets from the margins inwards, and, in this way, sometimes completely destroy the crops, if the weather is cold and unfavourable to growth after the young plants have come through the soil. Strong, healthy plants suffer least from them. The life-history of these Weevils has been followed out, within the past three or four years, by Messrs. Hart and Christy. The larvæ feed on the roots of Clover, and, it may be presumed, of other *Leguminosæ*. They have been observed of all sizes and ages in the autumn, and many of them live through the winter as larvæ, and reach their full size in spring. When full-grown, they are footless, wrinkled, white maggots. They become pupæ in oval, earthen cells, lin. to 2in. below the surface of the soil; and in two or three weeks they emerge as beetles. It would thus seem that the larvæ are injurious; but the beetles are far more so. They are apt to remain undetected in their depredations, as, when in danger, they drop at once from the plants to the soil and hide under particles of earth, &c.; but pressure, or stamping with the feet, on the soil around the plants, makes the beetles

**Sitona**—*continued*.

come out in swarms. They seem to pass the winter in open ends of stubble, or in any other convenient retreat.

**Remedies.** The best is probably to make up the seed-bed so as to be favourable to rapid and healthy growth of the young plants, thus rendering them able to survive the attacks of the Weevils. For the same reason it is well to water the plants in dry weather. It is recommended also to lay wood-ashes or coal-ashes along the drills above the rows of Peas or Beans, as this favours growth. Rolling the ground brings the Weevils to the surface, and kills many of them. Applications of lime or soot to the wet leaves renders these distasteful to the insects; but the most useful application yet tried is paraffin, in a solution of about two ounces to one gallon of water, with which the plants should be watered.

**SIMUM** (from *Sion*, the old Greek name, used by Dioscorides). Water Parsnip. *ORD. Umbelliferae*. A small genus (four species) of glabrous, hardy herbs, natives of North temperate regions, South Africa, and St. Helena. Flowers white, in compound umbels; involucre bracts numerous. Leaves pinnate; pinnæ toothed. *S. angustifolium* and *S. latifolium* are British plants. *S. Sisarum* (Skirret) is removed, by Bentham and Hooker, to *Pimpinella*. The species possess no horticultural value.

**SKIMMIA** (from *skimmi*, a Japanese word, signifying a hurtful fruit). *ORD. Rutaceæ*. A genus comprising about half-a dozen species of pretty, hardy, evergreen, highly glabrous shrubs, with green branchlets, natives of the Himalayas and Japan. Flowers whitish, clustered; calyx short, four or five-lobed; petals four or five, oblong, much longer than the calyx, valvate or loosely imbricated; disk inconspicuous; panicles terminal, branched. Drupes ovoid, fleshy, two to four-stoned. Leaves alternate, simple, petiolate, lanceolate, entire, coriaceous, pellucid-dotted. The species thrive in a compost of peat and loam. Propagation may be effected by cuttings, inserted in sand, under a bell glass, in gentle heat; and by seeds, sown, when ripe, in sandy loam and peat.



FIG. 491. TIP OF BRANCH, WITH INFLORESCENCE, OF *SKIMMIA FRAGRANS*.

**S. fragrans** (fragrant). *fl.* white, fragrant, disposed in terminal panicles. *l.* elliptic-oblong, thick. *h.* about 3ft. See Fig. 491. (R. H. 1880, p. 56, Fig. 11.) Of this garden plant only the female is at present known.

*Skimmia*—continued.**S. fragrantissima.** See **S. oblata.**

**S. intermedia** (intermediate). *fl.* white, rosy on the outside, scented, disposed in spike-like panicles. Spring. *l.* narrow-elliptic, coriaceous, deep green. 1870. A much-branched and compact, garden variety, intermediate between *S. fragrans* and *S. japonica*.



FIG. 492. BRANCHLET, WITH FLOWERS AND FRUITS, OF *SKIMMIA JAPONICA*.

**S. japonica** (Japanese). \* *fl.* white, resembling those of some Hollies, deliciously scented; petals spreading; panicles thyrsoid, pedunculate, broadly-oblong, many-flowered. *fr.* roundish-oval, bright red. March. *l.* alternate, but here and there crowded, so as to appear sub-verticillate, oblong, acuminate, entire, pellucid-dotted, tapering into short footstalks. *h.* rarely above 3ft. or 4ft. Japan, 1845. A very handsome shrub when in full berry. See Fig. 492. (B. M. 4719; G. C. n. s., xxv. p. 244; I. H. 1854, 13; L. & P. F. G. ii. 163; S. Z. F. J. 68.)

**S. j. argentea variegata** (silvery-variegated). *l.* oblong, acuminate, broadly and unequally bordered with white. 1875



FIG. 493. BRANCHLET IN FLOWER AND FRUIT, AND DETACHED FLOWER, OF *SKIMMIA OBLATA* VEITCHII.

*Skimmia*—continued.

**S. Laureola** (Laureola). \* *fl.* pale yellow, very fragrant, densely disposed in terminal, compact corymbs; rachis and peduncle purple-dotted. Spring. *fr.* ovate, smooth, nearly as large as an olive. *l.* approximating at the tips of the branches, sub-opposite or ternate, oblong-lanceolate, acute, attenuated at base, entire, 3in. to 5in. long, dark green above, yellowish beneath. *h.* 4ft. Nepal. A very pretty, Citron-scented shrub. SYN. *Limonia Laureola*.

**S. oblata** (oblate-berried). \* *fr.* very bright vermilion-red, oblate, glossy, borne in panicle clusters. *l.* firm, smooth, elliptic-obovate, bright green. Japan, 1864. (G. C. n. s., xxv. p. 245.) A remarkably beautiful, dwarf shrub, of dense habit. The male or pollen-bearing plant is known in gardens by the name of *S. fragrantissima*.

**S. o. Veitchii** (Veitch's). *fl.* hermaphrodite or monœcious, in spike-like racemes; petals dirty-white. Spring. *fr.* spherical, of a beautiful coral-red. *l.* flat, elliptic, oboval, glossy, narrowed into a thick petiole. *h.* 3ft. See Fig. 493. (R. H. 1880, p. 57, fig. 13.)

**S. ovata** (ovate). This appears to be a garden form of *S. japonica*, with larger, broader leaves than the type.



FIG. 494. FLOWERING BRANCHLET, AND PORTION OF DETACHED INFLORESCENCE, OF *SKIMMIA RUBELLA*.

**S. rubella** (reddish). \* *fl.* greenish-white, disposed in thyrses, odorous; buds tinted with red, hence the name. *l.* lanceolate-elliptic, leathery. China, 1874. See Fig. 494. (R. H. 1874, 311; 1880, p. 57, fig. 12; 1885, p. 189.)

**SKINNERIA.** Included under *Ipomœa*.

**SKIOPHILA.** Included under *Episcia* (which see).

**SKIPJACKS.** See **Wireworms**.

**SKIRRET** (*Sium Sisarum*). A perennial, cultivated, but not extensively, for its roots, which are rather large, and composed of fleshy, tuberous prongs joined together, as shown in Fig. 495. Leaves pinnatisect; segments oblong-acute serrate; involucre five-leaved, reflexed. The roots are white, and are cooked and served in a similar way to those of Salsafy. Skirret may be propagated by slipping off the side roots before growth commences in spring, and dibbling them in ordinary garden soil, but it is generally increased by seeds. These should be sown in drills, about 1ft. apart, early in April, and the seedlings thinned, when large enough, to 6in. or 8in. asunder. A rather light soil, which has not been very lately manured, is best suited to the requirements

**Skirret**—*continued*.

of Skirret. The roots may be used from the end of September onwards, through the winter; before growth commences in spring, they should be lifted and stored in moderately dry sand.



FIG. 495. TUBEROUS ROOTS OF SKIRRET.

**SKIRWORT.** An old name for **Skirret** (which *see*).

**SKULL CAP.** *See* **Scutellaria**.

**SKUNK CABBAGE OR WEED.** *See* **Symplocarpus foetidus**.

**SLASHED.** The same as **Lacinate** (which *see*).

**SLATERIA.** A synonym of **Ophiopogon** (which *see*).

**SLIPPER FLOWER, or SLIPPERWORT.** *See* **Calceolaria**.

**SLIPPER, LADY'S.** *See* **Cypripedium**.

**SLIPPER SPURS.** *See* **Pedilanthus**.

**SLIPPERWORT.** *See* **Calceolaria** and **Campanula**.

**SLIPS, PROPAGATION BY.** A term used in reference to plant-propagation in cases where a specimen may be taken up and divided into several pieces, each of which shall have roots attached, and be capable of forming a plant itself when placed under the proper conditions. Common Box is referred to as an example of a plant that may be increased in almost any quantity from Slips. There are many other subjects which may be similarly propagated.

**SLOANEA** (named in honour of Sir Hans Sloane, born in Ireland in 1660, President of the Royal Society, founder of the British Museum and the Chelsea Botanic Garden; he died in 1753). **ORD.** *Tiliaceæ*. A genus comprising about thirty species of stove, tropical American trees. Flowers racemose, panicled, or fascicled, axillary or terminal, rarely solitary; sepals or calyx lobes four or five, valvate, rarely coalescing; petals absent, or very rarely one to four, sepaloïd; stamens numerous. Leaves alternate or sub-opposite, entire or toothed, penninerved. The two species introduced are fine trees, with large leaves. A compost of loam and peat is most suitable. Propagated by cuttings of ripened wood, inserted in sand, under a glass, in heat.

**S. dentata** (toothed). *f.* white, large. August to November. *l.* ovate, acute, bluntly toothed; stipules cordate-triangular, serrated. *h.* 50ft. 1752.

**S. sinemariensis** (Sinemaria). *f.* white, small; racemes axillary. July and August. *l.* roundish-ovate, entire, lft. long; stipules long, acuminate, deciduous. *h.* 50ft. 1820.

**SLOE.** *See* **Prunus spinosa**.

**SLOPES.** In gardening, any piece of land on an inclined plane may be called a Slope; but the term is most generally used in reference to lawns when they are naturally or artificially undulated. Grass or lawn Slopes have to be laid out much in accordance with the space they occupy, and the disposition of the land above and below them. In forming Slopes, the land should be made equally firm throughout, to prevent one part subsiding more than another after the work is finished; a practised eye is one of the principal helps in rendering the surface and incline uniform. When alterations are in progress, the formation of a Slope often saves an immense amount of work, by utilising spare soil or forming an undulating surface of that naturally placed, instead of carting it away. Gardens situated on sloping ground have an advantage in being more readily drained than if they were on the level, they are also much better situated, provided the aspect is favourable for exposure to the sun.

**SLOW-MATCH TREE.** A common name for *Careya arborea*.

**SLUGS.** These molluscs are only too well known to everyone, because of the injury done by them to almost all kinds of garden produce. They are especially partial to young, newly-opened leaves of salad plants, *e.g.*, Lettuce; but they also eat holes in Carrots, Turnips, and other fleshy roots, and are frequently very troublesome among flowers, not only in borders, but also when potted. Slugs are far less frequently seen than might be expected from their extreme abundance, because of their habit of living concealed, during dry weather, by day, and coming out only after a shower, or at night. Several species are very common. The more important and destructive of these are the following: *Arion ater*, the Black Slug, is usually more common by roadsides and in waste places than in gardens; this animal is usually black, though sometimes reddish, but its form and general aspect are easily recognised, whatever the colour. *A. hortensis*, the Garden Slug, is also common, but is smaller and more slender, and shows grey stripes lengthwise. *Limax maximus* is our largest Slug, some specimens being 6in. long when stretched out. This species, when full grown, is easily known by its size, but is not abundant anywhere, though more common than it seems. It is spotted and streaked with black. *L. flavus*, the Yellow Slug, and *L. agrestis*, the Field Slug, are very common all over the country; and *L. arborum*, the Tree Slug, and *L. Sowerbii*, the Keeled Slug, are plentiful in some parts of Britain. In all the Slugs of the genera *Arion* and *Limax*, the body seems quite naked, the shell being reduced to a small, useless vestige, inclosed in the swollen part in front, known as the mantle. By all of them, in common with most molluscs, the tongue is used for cutting their food; it is a long belt, or riband, bearing cross rows of small, horny teeth; as these are worn away on the front of the riband, it is renewed by growth behind. The number and forms of the teeth, and the development of the shell, are of great use in distinguishing the species of Slugs. They all move about by means of contractions and elongations of the broad, flat, lower surface, or foot.

**Remedies.** Among the most effectual are baits, such as cabbage or lettuce leaves, hollowed slices of apples, carrots, potatoes, or turnips, laid near the plants that peculiarly need protection. These traps should be frequently examined, and the Slugs knocked off into ammoniacal solution, *e.g.*, gas-water; or they may be covered with quicklime, or with wood-ashes, salt, or soot. All these latter applications require to be repeated once at least, as the Slugs resist their action by throwing out a thick coat of slime, from which they can crawl out not much the worse; but they seem unable to repeat this operation

**Slugs—continued.**

immediately, if they are covered with the materials a second time. A ring of quicklime or of soot on the soil around choice plants, forms a protection against injury by Slugs, which will not cross these substances. A successful method of destroying Slugs is to water the soil with solution of ammonia; this brings them out, and usually kills them; and, in any case, they are rendered white and conspicuous, and can easily be picked up and put into a vessel for removal. Hand-picking is most effectual in moist evenings; but this method is slow and irksome, though effectual with potted plants. Trees may be protected against the ascent of Slugs to the fruit, by tying a new horsehair rope round the stem, or by putting a layer of quicklime or soot, &c., on the soil round the trunks. The layer should be renewed as required.

Slugs and Snails can lower themselves from branches, by threads formed of the thickened slime in which they are enveloped. One genus of Slugs, found in various places in the South of England, may be regarded as useful in gardens; this is *Testacella*, represented in England by *T. haliotidea*, and near Bristol by *T. Maugei*, which was naturalised, and has recently become abundant there. These two species live on earthworms, which they follow into their burrows. They are easily known by the existence of a small shell on the hind part of the body. See *Testacella*.

**SLUGWORMS.** By this name are denoted the larvæ of certain Sawflies belonging to the genus *Eriocampa*, and characterised by their slug-like form and habits. The larvæ have the body covered with a secretion, which on some is white, and flaky or powdery, while on others it is dark green or black, and slimy, increasing their likeness to miniature slugs; on the larvæ of some species it is yellowish, and is but small in amount. The Sawflies are small, with short, stout, black and glossy bodies. The legs are black, with the tibiae and tarsi marked with rings varying from white to a more or less yellow tint. The antennæ are short, and thickened in the middle. The arrangement of cells in the neurulation of the fore wings is also characteristic. The more common species are the following: *E. annulipes*, feeding on the lower surface of the leaves of Lime, Oak, Birch, and Willow; *E. limacina* (*Selandria Cerasi* in Miss Ormerod's "Manual of Injurious Insects"); *E. ovata*, feeding on Alder; and *E. Rosæ*, the larvæ of which feed on the upper surface of leaves of Roses, and gnaw away the epidermis. The larvæ of *E. limacina* are pre-eminently the Slugworms, because of their form, dull colour, sluggish habits, dark, slimy excretion, and general appearance. The damage done by them to the leaves

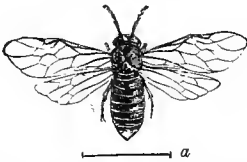


FIG. 496. *ERIOCAMPA LIMACINA* (the Larva of this is the Slugworm of fruit-trees)—a, Line to show actual spread of wings.

of fruit-trees is, at times, very great. This Sawfly (see Fig. 496) is about  $\frac{3}{4}$  in. long, and is black and shining, but hairy; the tibiae are yellow-brown or brownish; the wings are transparent, except a broad, smoky band in the middle. The eggs are laid on the lower surface of the leaves. The larvæ, when newly-hatched, are white, but soon become greenish-yellow, with a black head. The whole body is covered with a dark, resinous secretion. In form, it is broader just a little behind the head, which is over-arched by a hump; from this point it tapers rapidly backwards. At the last moult, the

**Slugworms—continued.**

resinous coat is thrown off, and the head becomes coloured like the body. The larvæ feed on a great variety of trees and shrubs, chiefly among *Rosaceæ*, e.g., Almond, Apple, Bramble, Cherry, Hawthorn, Pear, Plum, &c.; but they also live sometimes on Birch, Oak, &c. They congregate, in companies of three or four, on the upper surface of the leaf, feeding on the epidermis only; but the whole leaf becomes brown, dead, and shrivelled, and at last falls off. The larvæ are very voracious, and are also very sluggish in their habits. They may be found during autumn. When full-fed, they fall to the ground, burrow into it, and there spin black cocoons for their protection while in the pupa stage.

**Remedies.** Many remedies have been employed. The best is hellebore, mixed with water, poured from a watering-pot on the larvæ. Tobacco-water, and lime-water, with about 1lb. of soft soap to fifteen gallons of the fluid, are recommended; and soapsuds by themselves have been found useful. The pupæ may be destroyed, in winter, by skimming the surface soil, to a depth of 3 in. or 4 in., from below the trees and hedges infested by the insects, and burning it. The Sawflies are sluggish, and can be caught by shaking or heating the plants over an umbrella or sheet, or tarred boards. They are abundant throughout Europe and in North America, and are said to have been introduced into New Zealand.

**SMALL ERMINE MOTH.** See *Hawthorn Caterpillars*.

**SMALL FLAX LILY.** See *Phormium Cookianum*.

**SMALL STAG BEETLE.** See *Lucanus*.

**SMEATHMANNIA** (named after Smeathmann, a naturalist, who travelled in Africa, and collected many botanical specimens). *SYN. Bulowia. ORD. Passifloræ.* A genus comprising four species of beautiful, stove, evergreen shrubs, with robust, terete branchlets, natives of Western tropical Africa. Flowers white, inodorous, rather large, axillary, sub-solitary, shortly pedunculate, hibracteolate; calyx with a very short tube, and five oblong lobes; petals five, slightly longer than the calyx; corona coriaceous, ciliated, urceolate, crenulated or lobed; stamens about twenty. Leaves oblong, coriaceous, serrated; petioles bearing one to four glands at the apex. The species, two of which have been introduced, are remarkable for their erect habit, in a natural order including so many creepers and twiners. A compost of loam, peat, and sand, is best suited to the requirements of these shrubs. Propagation may be effected by half-ripened cuttings, inserted in sand, under a glass, in heat.

*S. lævigata* (smooth-stalked). *fl.* curved downwards; petals oblong, spreading, as well as the calyx; stamens and pistil elongated, on a short, thick stipes. July. *l.* alternate, somewhat distichous, coarsely serrated, tapering at the base into a short petiole. Branches spreading. *h.* 6 ft. 1823. (*B. M.* 4194.)

*S. pubescens* (downy). *fl.* large, on short, axillary peduncles; sepals and petals acute and spreading; stigmas downy. February. *l.* alternate, shortly petiolate, oblong, glossy, acute, pinninerved, sinuately dentate, obtuse at the base; petioles scarcely two lines long, with very conspicuous glands. Branches terete; young ones, as well as the petioles, midribs of the leaves beneath, peduncles, and sepals, ferruginously hairy. *h.* 6 ft. 1845. (*B. M.* 4364.)

**SMEGMADERMOS.** A synonym of *Quillaja* (which see).

**SMILACEÆ.** A tribe of *Liliaceæ*.

**SMILACINA** (a diminutive of *Smilax*, to which genus, however, the plants bear little resemblance). False Solomon's Seal. *SYNS. Astaranthemum, Jocasce, Medora, Neolexis, Polygonastrum, Sigillaria, Tovarja. ORD. Liliaceæ.* A genus embracing nearly a score species of mostly hardy perennials, natives of North and Central America, and temperate and mountainous Asia. Flowers small, on short pedicels; perianth at length deciduous,

**Smilacina**—continued.

the segments distinct or shortly connate towards the base; stamens six; inflorescence terminal, shortly pedunculate, racemose or forming a simple panicle; bracts small or obsolete. Leaves alternate, very shortly petiolate, ovate, lanceolate, or rarely narrow. The best-known species are described below. They succeed in any light soil, and may be readily increased by divisions.

**S. bifolia** (two-leaved). A synonym of *Maianthemum bifolium*.

**S. borealis** (Northern). A synonym of *Clintonia borealis*.

**S. canadensis** (Canadian). A synonym of *Maianthemum bifolium*.

**S. oleracea** (culinary).\* *fl.* in a deltoid, terminal panicle, minutely bracteate; perianth white, tinged with rose outside, globose, about  $\frac{1}{2}$  in. long and broad; pedicels  $\frac{1}{2}$  in. long, deflexed or ascending. May. *fr.*, berry rose-purple, with dark spots. *l.* 6 in. to 7 in. long, alternate, oblong-acuminate, minutely pubescent beneath. Stem sub-erect, simple. *h.* 4 ft. Sikkim, 1877. (B. M. 5315, under name of *Tovaria oleracea*.)

**S. racemosa** (racemose). False Spikenard. *fl.* on solitary pedicels; perianth whitish, one line long; panicle oblong or deltoid, shortly pedunculate, 2 in. to 6 in. long, the branches dense-flowered, ascending. May. *l.* ten to fifteen, ascending, oblong or lanceolate, acuminate, 3 in. to 9 in. long, paler and puberulous beneath. *h.* 2 ft. to 3 ft. North America, 1640. (B. M. 899, under name of *Convallaria racemosa*.)

**S. stellata** (star-like).\* Star-flowered Lily of the Valley. *fl.*, perianth white, two to three lines long; racemes somewhat dense, ten to twenty-flowered, very shortly pedunculate, 1 in. to 1½ in. long. May. *l.* six to fifteen, ascending, oblong or lanceolate, 2 in. to 6 in. long, acute or acuminate, sessile and semi-amplexicaul, glaucous and puberulous beneath. *h.* 1 ft. to 2 ft. North-west America, 1653. (B. M. 1043 and L. B. C. 1060, under name of *Convallaria stellata*.)

**S. uniflora** (one-flowered). A synonym of *Clintonia uniflora*.

**SMILAX** (the ancient Greek name used by Theophrastus). American China Root. **TRIBE** *Smilacæ* of **ORD.** *Liliacæ*. This genus embraces, according to Alph. de Candolle, 187 species of stove, greenhouse, or hardy, sarmentose shrubs, rarely dwarf and sub-herbaceous, broadly dispersed over temperate and tropical regions. Flowers small, dioecious, pedicellate, in umbels (or cymes), often numerous; stamens of the males six, rarely indefinite; staminodes of the females six or fewer; umbels pedunculate or sessile, axillary or terminal. Leaves alternate, distichous, or rarely opposite, often perennial; petioles furnished with two tendrils; floral leaves usually reduced to bracts. *Smilax* is, on the whole, one of the most important genera from an economic standpoint. The roots of several species constitute the well-known Sarsaparilla of our shops. The rootstocks of *S. China* are eaten by the Chinese; and those of *S. Pseudo-China* are used in the manufacture of a kind of beer in South Carolina. A selection of species grown in gardens is given below. They boast of no particular beauty, but are plants of considerable interest, and mostly hardy. A sandy-loam soil is best adapted to their requirements. Propagation may be effected by divisions of the root.

**S. aspera** (rough).\* Prickly Ivy. *fl.* whitish or flesh-coloured, fragrant; spikes longer or shorter than the leaves. July. *l.* frequently cordate at base, hastate, or deltoid-lanceolate, acuminate or cuspidate, sometimes white-spotted. Stems prickly. *h.* 5 ft. to 10 ft. South Europe, &c., 1646. (S. F. G. 959.)

**S. a. angustifolia** (narrow-leaved). *l.* narrow, elongated. (L. B. C. 1799, under name of *S. sagittifolia*.)

**S. a. mauritanica** (Mediterranean).\* *fl.* greenish-yellow, fragrant. A very beautiful, half-hardy, evergreen climber, of considerable size, well suited for conservatory decoration. 1884. (G. C. n. s., xxii, p. 185.)

**S. a. punctata** (spotted). A variety having the leaves spotted with white. (R. G. 683.)

**S. asperrima** (very rough). A garden name for a plant which at present cannot be determined.

**S. auriculata** (auricled). *fl.* small, very fragrant. *fr.*, berry small, globose. *l.* green, glossy, and widened at the base so as to become sub-hastate; the front portion three-nerved, with two short, additional nerves in the widened basal angles. Stems striated, freely furnished with short, white, recurved spines. Southern United States, 1884. An elegant, half-hardy, evergreen climber.

**Smilax**—continued.

**S. australis** (Southern). *fl.* white, or pale green or purple; umbels many-flowered, on axillary peduncles. Summer. *l.* from ovate-lanceolate or oblong to nearly orbicular, 2 in. to 4 in. long, or rarely much larger; petioles short and twisted. Stems and branches usually more or less armed with scattered prickles. *h.* 3 ft. to 5 ft. or more. Australia, 1791. **SYN.** *S. latifolia*.

**S. Bona-nox** (Good-night). *fl.* greenish-white; peduncles longer than the petioles. June and July. *l.* tardily deciduous, varying from round-cordate and slightly contracted above the dilated base to fiddle-shaped and halberd-shaped or three-lobed, green and shining on both sides, cuspidate-pointed, the margins often somewhat twistily ciliate or spinulose. Branches and branchlets sparsely armed with small, rigid prickles. *h.* 5 ft. to 10 ft. North America, 1738. **SYN.** *S. tamnoides*.

**S. B.-n. hastata** (halberd-shaped). *l.* narrower than in the type, thickly beset with prickles on the margins. 1820.

**S. B.-n. rubens** (reddish). *l.*, tendrils purplish. Branches sparsely prickly. (W. D. B. 108, under name of *S. rubens*.)

**S. China**. China Root. *fl.* greenish-white; peduncles much shorter than the leaves, longer than the petioles. August. *l.* deciduous, ovate rounded, the young ones abruptly narrowed and acute at the base, at length sub-cordate, acute, cuspidate, or retuse at apex, entire. *h.* 20 ft. China and Japan, 1759. The edible root is very large, fleshy, and reddish.

**S. discolor** (discoloured). *l.* about 9 in. long and 4 in. broad, oblong-ovate, suddenly acuminate, firm, irregularly blotched when young with purplish-brown, five-nerved. Mexico.



FIG. 497. SMILAX ORNATA.

**S. glauca** (glaucous). *fl.* greenish-white; peduncles longer than the petioles flattened. July. *l.* tardily deciduous or partly persistent, ovate, rarely sub-cordate, glaucous beneath, and sometimes also above (as well as the young branchlets), abruptly mucronate, the edges smooth and naked. Branches terete, and, as well as the somewhat quadrangular branchlets, armed with scattered, stout prickles, or naked. *h.* 3 ft. North America, 1815. (B. M. 1846; W. D. B. 111, under name of *S. Sarsaparilla*.)

**S. glycyphylla** (sweet-leaved). Botany Bay Tea and Tree *fl.*, perianth nearly globular in bud; peduncles axillary and simple, or a few of the upper ones in a terminal panicle. Summer. *l.* lanceolate or ovate-lanceolate, 1½ in. to 3 in. long or rarely more, acute or acuminate, narrowed or rounded, or rarely almost cordate at base, rigid, often glaucous or white beneath, sometimes green on both sides; petioles twisted, bearing slender tendrils. Australia. Plant glabrous, unarmed. Greenhouse.

**S. herbacea** (herbaceous). Carrion Flower. *fl.* carrion-scented; peduncles elongated, 3 in. to 4 in., or sometimes 6 in. to 8 in., long, twenty to forty-flowered. June. *l.* much shorter than the peduncles, long-petiolate, membranous, ovate-oblong or rounded, mostly cordate, mucronate-tipped, smooth. Stem herbaceous,

**Smilax**—continued.

never prickly, erect and recurved, or climbing. North America, 1699.

**S. h. Simsii** (Sims'). *l.* ovate-acuminate, sub-acute or obtuse at base, small. (B. M. 1920, under name of *S. herbacea*.)

**S. lanceolata** (lance-shaped). *fl.* greenish-white; umbels sometimes panicle; peduncles short, seldom exceeding the petioles, terete. June and July. *l.* thinish, rather deciduous, varying from ovate-lanceolate to lanceolate-oblong, narrowed at base into the short petiole, shining above, paler or glaucous beneath, many of them without tendrils. Branches terete, unarmed. *h.* 15ft. to 20ft. North America, 1785.

**S. latifolia** (broad-leaved). A synonym of *S. australis*.

**S. macrophylla maculata** (large-leaved, spotted). A synonym of *S. ornata*.

**S. marmorea** (marbled). A garden name for a plant which probably belongs to *S. ornata*.

**S. officinalis** (official). *fl.* unknown. *l.* oblong, slightly acute at base, abruptly acuminate at apex, membranous, 5in. to 7½in. long; petioles 2in. to 5in. long, the margins inflexed, sheathing. Young branches sub-cylindric, becoming somewhat quadrangular, armed with reflexed prickles. Chiriqui, &c., (about) 1866. (B. M. F. 289.)

**S. ornata** (adorned).\* *l.* ovate, acuminate, at length cordate at base, freely spotted with silvery-grey on a deep green ground, the marking being confined to the spaces between the veins; petioles prickly at back. Branches angular, armed with short prickles. Native place unknown, 1865. A handsomely-marked, greenhouse species. See Fig. 497. (I. H. 439.) SYN. *S. macrophylla maculata*.

**S. Pseudo-China** (false China). *fl.* greenish; peduncles two to four times the length of the petioles. July. *l.* 3in. to 5in. long, ovate-cordate, or on the branchlets ovate-oblong, cuspidate-pointed, green on both sides, often rough-ciliated, thin, becoming firm in texture. Stems and branches unarmed, or with a very few weak prickles. North America, 1739.

**S. quadrangularis** (four-angled). A synonym of *S. rotundifolia*.

**S. rotundifolia** (round-leaved).\* *fl.* greenish; peduncles flattened, rather longer than the pedicels, few-flowered. June. *fr.* blue-black, globular. *l.* thin, ovate or round-ovate, entire, 2in. to 4in. long, abruptly pointed, mostly rounded or slightly cordate at base. Stem climbing high, armed with scattered prickles. North America. (T. S. M. 610.) SYN. *S. quadrangularis* (W. D. B. 109).

**S. salicifolia variegata** (variegated Willow-leaved). *l.* elliptic-lanceolate, finely marbled with white between the ribs, and thus appearing to be marked with four irregularly-margined, white bands, very ornamental. Branches angular, rarely sub-terete, armed with recurved prickles. Para, 1867. Greenhouse. (I. H. 521, under name of *S. longifolia foliis-variegatis*.)

**S. Shuttleworthii** (Shuttleworth's). *l.* large, cordate, acuminate, deep green, marked with confluent blotches of silvery-grey, the young ones purplish at back; petioles curiously deflexed at base. Columbia, 1877. A free-growing, stove climber.

**S. tannoides** (Black Bryony-leaved). A synonym of *S. Bona-nox*.

**SMITHIA** (named in honour of Sir James Edward Smith, 1759-1828, F.R.S. and P.L.S., founder of the Linnean Society, author of "English Botany," "Flora Britannica," and other works). ORD. *Leguminosæ*. A genus comprising about a score species of stove herbs, sub-shrubs, or shrubs, inhabiting tropical Asia and Eastern Africa. Flowers mostly yellow, rarely purple or violet streaked with yellow, often in unilateral, axillary racemes; calyx deeply cut, the lobes connate in two lips; standard sub-orbicular, shortly clawed; keel incurved, obtuse, or slightly rostrate; bracts and bracteoles scarious or striated, persistent. Pods folded back into the calyx. Leaves impari- or abruptly pinnate; leaflets small, often falcate, exstipellate; stipules membranous or scarious, persistent. *S. purpurea*, the only species which calls for description in this work, requires culture similar to *Mimosa* (which see).

**S. purpurea** (purple). *fl.* purple, the round standard and the wings marked with white spots; bracts ovate, ciliated; peduncles bristly, equalling the leaves. Summer. *l.* leaflets oblong, long-apiculate, ciliated; stipules adnate, ovate, terminated by a hristle. Stem erect, branched, glabrous. *h.* 6in. to 12in. East Indies, 1848. Annual. (B. M. 4285.)

**SMOKE.** Except in towns, or in the immediate neighbourhood of smelting-furnaces and coke-ovens, or (though to a less degree) of brickworks and limekilns, Smoke can scarcely be regarded as hurtful to gardens and plantations. In and around large cities, particularly in the

**Smoke**—continued.

manufacturing districts of England and Scotland, the air is charged with soot, in either a fine or a coarse state of division. The soot consists chiefly of carbon, and along with it small quantities of various compounds (empyreumatic oils, &c.) formed in the combustion of the fuel. All are familiar with the black coating that settles on everything from an atmosphere polluted with Smoke. This coating upon leaves and twigs is injurious by clogging the stomata, or small openings through which air passes into the tissues; and it also hinders the work of the leaves by shutting out part of the light that they should receive to keep them in health, and to fit them to supply the plants with food. This source of danger can be overcome by keeping the plants clean by syringing,\* or by washing those that are so delicate as to require special care, and so valuable as to deserve the labour. Nor is the danger so frequent as might be imagined from the prevalence of a black, sooty deposit on plants, even those in greenhouses, since these deposits are far oftener composed of Fungi (*Fumago*, &c.) than of soot. Moreover, the presence of Carbonic Acid (the most abundant product of combustion) in the atmosphere is necessary to green plants, of which it is a most important food.

The real danger to plants in the vicinity of towns and smelting-works arises from the presence, in the gases formed during combustion, of poisonous products, of which Sulphurous Acid gas is by far the worst. Its presence is due to the existence of sulphur in the coal as an impurity. Hardly any coal is free from sulphur; and its compound, Iron Sulphide or Pyrites, may often be seen as a yellow, shining coat on the smooth sides of lumps of coal. The leaves of plants show traces of poisoning by Sulphurous Acid gas, when the proportion in the atmosphere does not exceed 1 in 1,000,000 parts, if exposed to this mixture for a considerable time; and Stockhardt found that Clover and grasses showed its effects when exposed twice, for two hours each time, to 1 part in 40,000, the leaves becoming brown at the tips, and the plants withering. But the experiments are usually carried on with plants in confined air, under bell glasses; and it must be remembered that, in the open air, plants are seldom exposed to the *continuous* action of the gas, and that the danger is, therefore, considerably less than the amount of gas occasionally contained in the air would indicate. It has been found that the leaves of plants poisoned with Sulphurous Acid gas show, at first, translucent spots between the veins. These spots become dull green, and then brown, dry, and shrivelled. When water is copiously supplied to the roots, drops of water often stand along both sides of the larger veins of the leaves. Along the veins extend green borders, which form a network in the brown, dry leaves. The cells of the green parts retain abundance of fluid. This green network is an indication of the cause of harm; and chemical analysis of the leaves affords a proof of the presence of sulphur in excess, and confirms the indication given by the colour. The leaves of Conifers become dull green at the tip; then this changes into brown-red, sharply separated from the green parts below. But in these leaves the effect is very similar to that of frost, or other causes of injury; and the only certain indication is given by chemical analysis, proving the presence of excess of sulphur. Conifers are found to suffer most severely from the action of the gas, as their leaves are less readily renewed. Herbs, under similar exposure, suffer more than ordinary deciduous trees. Plants are injured less by exposure to the gas during darkness, and least of all during winter, when growth has ceased for a time. Limekilns are not so hurtful as smelting-furnaces, since the gas combines with the lime, and forms Sulphate of Lime, which prevents its escape in a hurtful form. Another injurious substance in the



**Smoke**—continued.

fumes from some works, is Hydrochloric Acid gas, which is emitted during the formation of various chemical products. The only thorough remedy is the stoppage of the emission of the gases; but the harm may be lessened by restricting these injurious processes to winter, or to the night-time if they must go on in summer.

**SMOKE-PLANT.** See *Rhus Cotinus*.

**SMOKE-WOOD.** A common name for *Clematis Vitalba*.

**SMOOTH FLOWER.** A popular name for *Leianthus longifolius*, and other species.

**SMOOTH-FRUITED HORSE CHESTNUT.** See *Pavia*.

**SMUT.** The name given to a group of Fungi which grow among the tissues of the stamens, ovaries, and leaves of many plants, but especially infest the Cereals (e.g., Barley and Oats) and other grasses. The scientific name of the group is *Ustilaginei* (from *ustus*, scorched), and refers to the scorched appearance of ears of Corn, or of other parts of plants, infested with the Fungi. The name Smut also refers to the dirty, sooty aspect of the Fungi. In the early stages, they consist of interwoven masses of mycelium, the threads of which bear numerous spores, either in a group on the tip of each thread, or singly on slender branches along their sides, near the tips. The spores vary a good deal in the different genera, some being one-celled, others made up of cells grouped together to form a rounded mass, each cell in which may be fit to produce a new plant, or only the central cell may be fit to do so, the outer ones being sterile. In most of the species, the spores are more or less deeply coloured, and in the typical Smuts they are dark brown individually, and sooty-black when in masses. The outer tissues of the host-plant are usually torn open by the pressure of the ripening spores, and the dark, powdery masses of spores are displayed and become very conspicuous. It does not fall within the scope of this work to discuss the Smuts that attack grasses, serious though their effects frequently are. Few flowering plants are liable to much injury from the Fungi of this group. *Ustilago violacea* destroys the anthers of a good many species of *Caryophyllæ*, e.g., *Dianthus Carthusianorum*, *D. superbus*, *Saponaria officinalis*, various species of *Silene*, &c.; the spores are one-celled, roundish, and pale violet. *Sorosporium* has the spores formed each of a mass of several equal cells. *S. Saponaria* distorts the anthers of the same *Caryophyllæ* as *U. violacea*; *S. hyalinum* consumes the seeds of *Astragalus glycyphyllos*, of a few other *Leguminosæ*, and of *Convolvulus sepium*; *S. primulicolum* lives on young seeds of *Primula elatior*, *P. farinosa*, and *P. vulgaris*, destroying them, but showing no sign on the exterior of the ovaries. *Urocystis* has spores like those of *Sorosporium* except in the outer cells being smaller and sterile, the inner larger and fertile; *U. Viola* causes large swellings in the stalks and blades of the leaves, and in the stolons, of *Viola odorata*; *U. Anemones* causes similar swellings on various species of *Anemone* and other *Ranunculaceæ*; *U. sorosoides* covers the leaves of *Thalictrum minus* with dark patches of spores.

Remedies cannot be employed owing to the Fungi growing inside the tissues of the host-plants. The affected plants ought to be removed and burned, to prevent the spread of the disease.

**SMYRNIUM** (the old Greek name, used by Dioscorides, and derived from *smyrna*, one of the names of myrrh; alluding to the odour of the plants). Alexanders. ORD. *Umbellifere*. A small genus (six or seven species) of erect, glabrous, hardy, biennial herbs, natives of Europe, North Africa, and Western Asia. Flowers yellow, polygamous, in compound, many-rayed umbels.

**Smyrniun**—continued.

Radical and lower leaves ternately-pinnately dissected; upper ones undivided, or having fewer segments. Before the introduction of Celery, *S. Olusatrum* was cultivated as a salad plant, under the names of Black Pot-herb, Common Alexanders or Alisanders, and Horse Parsley; it somewhat resembles Celery in flavour, but is stronger and less agreeable. None of the species have any horticultural value.

**SNAILS.** What has been already said in regard to **Slugs** (which see) is equally applicable to Snails, except that the latter animals possess large and conspicuous spiral shells, into which they withdraw at the approach of cold or dry weather, and in which they protect themselves by means of opercula of firm texture, with which they close the opening of the shell. Thus guarded against injury from without, they may remain motionless for long periods, even for several years. As regards the nature of the tongue and of the foot, their general habits, and also the methods of remedy, and of prevention of attacks, it is needless to repeat what is said under **Slugs**. Snails do not, however, commit such ravages as the latter creatures. It is necessary to break the shells to permit the remedies employed to reach their bodies. Hand-picking is probably the most certain cure. The injurious Snails chiefly belong to the genus *Helix*; but many of the smaller species, even in this genus, do no appreciable harm. The larger and more conspicuous kinds are: *Helix pomatia*, the "Apple Snail," whose shell reaches 2 in. in breadth, and is dull yellowish-white, with spiral lines of brown. This Snail is found only in the South of England, and is said to have been introduced by the Romans, by whom it was eaten, after having been fed up for some time, to bring it into good condition for the table. *H. aspersa*, the Common Snail, is usually common in gardens. The shell may reach 1½ in. in diameter; it is yellowish-brown, with five dark brown lines or narrow bands running round it; the epidermis is rough, and wrinkled. *H. hortensis* also occurs in gardens, but is commoner throughout Britain (along with *H. nemoralis*, of which it is often regarded as a variety) beside hedges or on banks, among tangled vegetation. Both forms vary much in colour of the shells, from white or yellow to brown, with from one to five dark brown lines or narrow bands around them; or the shells may show no markings. The chief difference between the two forms is that *H. hortensis* has the out-turned lip pale, while *H. nemoralis* has it dark; each is about 1 in. broad. The other species need not be separately mentioned, as they do little harm in gardens, or do not live there. Snails are preyed on by the larvæ of Glowworms and by other kinds of beetles, e.g., *Drilus*, *Staphylinus*, &c. Thrushes, blackbirds, and various other birds, feed greedily on them; and one of the best methods, when practicable, for reducing their numbers is to turn a flock of ducks into the place to be cleared. For other remedies, see **Slugs**.

**SNAKE GOURD.** See *Trichosanthes anguina*.

**SNAKE-MILLIPEDES.** A name applied, by John Curtis, to a genus of **Millipedes** (which see) named *Julus*, because of their resemblance in form to miniature snakes. Several of the species are of very frequent occurrence; and, at times, do a good deal of harm to Strawberries and other fleshy fruits on the ground, as well as to roots of plants.

**SNAKE-PLANT.** A common name for *Dracunculus vulgaris*.

**SNAKE-ROOT.** A popular name for many plants which possess reputed curative properties for snake-bites. The following are the most important: *Actæa racemosa*, *Aristolochia Serpentina*, *Cassaria ulmifolia*, *Chiococca angustifolia*, *Liatris scariosa* and *L. squarrosa*, *Ophiorrhiza Mangora*, and *Polygala Senega*.



**SNAKE'S BEARD.** See *Ophiopogon*.

**SNAKE'S HEAD.** See *Fritillaria Meleagris* and *Iris tuberosa*.

**SNAKE'S MOUTH ORCHIS.** See *Pogonia ophioglossoides*.

**SNAKE'S TONGUE.** A common name for *Ophioglossum* (which see).

**SNAKEWEED.** See *Polygonum Bistorta*.

**SNAKE-WOOD.** See *Cecropia* and *Strychnos colubrina*.

**SNAP BEETLE.** See Wireworms.

**SNAPDRAGON.** See *Antirrhinum*.

**SNAPWEED.** A name applied to various species of *Impatiens*.

**SNOUT MOTHS.** A small group of slender-bodied Moths, that take their popular name from the long palpi, or feelers, projecting like a snout from the front of the head. The form of the insect when the wings are closed is very characteristic, the wings lying almost flat, and giving an outline like the Greek letter delta ( $\Delta$ ), whence the scientific name *Deltoides* has been conferred on the group. None of the species are large, most of them scarcely exceeding lin. in spread of wings; while only one British species (*Hyppena proboscidalis*) reaches 1½ in. across the wings. This species feeds on Nettles, and may therefore be regarded as useful. Very few of the insects in the group are injurious to garden produce; in fact, the only one that deserves special notice as hurtful is the Buttoned Snout (*H. rostralis*), which, in the larval state, feeds on the Hop, and is very common in the Hop-growing districts. The moth measures a little over lin. across the fore wings, which are greyish-brown, with two dark brown cross-lines and a pale grey line near the hind margin, ending in a dark brown streak at the tip of each wing. In the middle of each fore wing is a raised tuft of scales. The hind wings are grey. The larva is slender, and pale green, with a narrow, dark green line down the back, and a broken, white line above the feet on each side; the head is brown. When the larva is touched, it jerks itself rapidly about. It forms a cocoon among dead leaves or other shelter on the soil, becomes a pupa, and comes out as a moth after about three weeks. The larvæ may be removed from Hops by beating the plants over an umbrella or sheet.

**SNOW.** In most cases, Snow may be regarded as beneficial in its effects on garden produce, inasmuch as it forms a very efficient protection against injury from frost. Plants under a few inches of loose snow suffer little harm from frosts that would prove fatal to hardier species without this protection. But Snow may also act hurtfully in spring by destroying seedlings. This occurs, in most cases, when a slight thaw is followed by frost, so as to cause the formation of a continuous surface-crust of ice. If this continues for some days, the young plants are much weakened, or are killed, owing to the necessary air being cut off; and, when the Snow is all melted, only the decaying remains show where they had been.

Evergreen trees are liable to serious injury from the pressure of Snow, which tears off or distorts their branches. Deciduous-leaved trees are much less liable to suffer in this way, as Snow can seldom adhere to the bare branches in quantity sufficient to cause harm. The danger is greatest during snowfalls in calm weather, with the temperature about the freezing-point, as the Snow then adheres to the branches and leaves, and collects into heavy masses. In windy weather, and at temperatures too low for the Snow to ball together, the risk is comparatively slight. The trees that suffer most from injuries due to the weight of Snow are Spruces,

**Snow—continued.**

and others with horizontal branches, the leaves on which are so arranged as to afford a considerable surface for the Snow to lie on.

**Remedies.** It is scarcely possible to do anything to save seedlings from injury, beyond breaking the ice-crust as much as possible. Trees may be eaved from being injured by the weight of Snow on the branches, if it is shaken off with long poles while loose. If a branch is entirely broken off, or so far as to hang down, the surface of the wound on the tree should be smoothed so far as possible, and covered with tar or any other convenient application, to prevent the entrance of moisture, or of parasites. If the injury is detected as the branch is beginning to yield, the Snow should be shaken off, and the branch supported by stays of any convenient kind.

**SNOWBALL-TREE.** See *Viburnum Opulus*.

**SNOW BERRY.** See *Chiococca* and *Symphoricarpos racemosus*.

**SNOWDROP.** See *Galanthus nivalis*.

**SNOWDROP-TREE.** See *Halesia*.

**SNOWDROP-TREE, AFRICAN.** See *Royena lucida*.

**SNOWFLAKE.** See *Leucoium*.

**SNOW FLOWER.** A name applied to *Chionanthus*.

**SNOW GLORY.** A common name for *Chionodoxa Lucilia*.

**SNOW IN SUMMER.** A popular name for *Cerastium tomentosum*.

**SNOW PEAR.** See *Pyrus sinensis*.

**SNOW-TREE.** See *Pyrus nivalis*.

**SNOWY FLY** (*Aleyrodes proletella*). A small, four-winged Fly, that lives on the lower leaves of Cabbages, often in such numbers as to cause the leaves to show yellow or pale patches, or even to wither and die, so that the plants are much injured where the attack is severe. The Snowy Fly is nearly related to Aphides, and resembles them in general form and in size, the length not exceeding  $\frac{1}{16}$  in., and the spread of wings being about  $\frac{1}{2}$  in. It has, however, no honey-tubes, and is snowy-white in colour, owing to its being covered with a white, powdery coat. Below this coat the head and the thorax are black, marked with yellow; the abdomen is yellow or rosy-red, and the front wings are marked with a dusky spot near the middle. On the head is a beak, as in Aphides, which is inserted into the leaf, and serves for sucking in the sap. The female insects place their eggs in patches on the leaves; and the young, on emerging, scatter themselves over the leaves, which they pierce with their suckers, and to which they adhere closely. Each then becomes covered with a white scale, bearing two yellow spots; and below this it becomes a pale pupa, with red eyes. The whole metamorphosis occupies nearly four weeks.

**Remedies.** The most reliable is to remove and burn infested leaves. A remedy less to be trusted is throwing them into a liquid manure tank, or into a farmyard, where the tramping under foot destroys the larvæ and pupæ. Dusting the plants with soot or ashes, and syringing with tobacco-water, have also been recommended.

**SOAP.** As a preventive against, or as a cure for, the depredations of insects on cultivated plants, Soap is often used, either in the form of suds, or along with other remedies (e.g., Carbolic Acid and Paraffin), which it helps to keep mixed with the water. Where Onions or roots, such as Carrots and Radishes, are suffering from the inroads of larvæ, great benefit is experienced

**Soap**—*continued.*

from watering the plants freely with soapsuds twice or thrice. It is recommended also to mix the soapsuds either with equal parts of gas-water, or with gas-tar in quantity such as to cause a strong smell, sufficient to keep the insects from laying eggs on the plants. Soap-boilers' waste, *i.e.*, the coarse, alkaline solutions that are formed as waste products in making Soap, have been found of service when used instead of the above mixture. Soapsuds are also used against caterpillars on Gooseberries and other plants, being applied by means of a syringe. When Soap is employed to cause insecticides to mix more readily with water, it is well to use Soft Soap, as being stronger, and better suited to effect the end in view. With its aid, a good many substances may be kept much more uniformly diffused in water than could otherwise be done. Carbolic Acid is prepared thus, in the proportion of one part of acid to ten of Soap, with which it is very thoroughly mixed. The mixture is then diluted to the desired strength; and the solution is sprinkled with a watering-pot on plants infested with Green Fly or larvæ, &c. Soft Soap is also used in combination with tobacco-water, sulphuret of lime, sulphur, or other substances, as a wash for the trunks of Apple-trees infested with American Blight; for walls, to destroy the Red Spider; and against such other injurious creatures as live on the bark or in crevices of the walls on which trees are trained. In all such mixtures, the substances used along with the Soap should be thoroughly mixed with it, and water should then be added till the mixture can be painted on the bark or wall; or more water may be used, and the fluid may then be rubbed well in with a stiff brush, or may be thrown from a syringe upon the places to be cleansed.

**SOAP BARK TREE.** See *Quillaja Saponaria*.

**SOAP BERRY TREE.** See *Sapindus*.

**SOAP BULB.** A common name for *Chlorogalum pomeridianum*.

**SOAPERS' ASHES.** These are occasionally used as manure for plants. They consist largely of carbonate of lime, mixed with sulphuret and sulphite of lime, and a small quantity of sand and other rubbish. While fresh, they injure plants, and ought therefore to be left exposed to the atmosphere for some time. If this is done, they absorb oxygen, and the sulphurets and sulphites become converted into the sulphate of lime, or gypsum; so that at last the effect, when they are employed as manure, is but little different from that which results from the use of the same quantity of a mixture of carbonate of lime (chalk) and sulphate of lime (gypsum). The value of Soapers' Ashes as manure is not great.

**SOAP PODS.** A popular name for the pods of several species of *Cassalpinieæ*.

**SOAPWORT.** See *Saponaria officinalis*.

**SOBOLES.** Shoots, especially those from the ground.

**SOBOLIFEROUS.** Bearing vigorous, lithe shoots.

**SOBRALIA** (named in honour of Don F. M. Sobral, a Spanish botanist). *ORD. Orchidææ*. About thirty species have been referred to this genus; they are tall, leafy, not tuberous, free-growing, stove, terrestrial orchids, natives of the Andes of tropical America, from Peru to Mexico. Flowers large and showy, few in a terminal, axillary raceme, sometimes reduced to one flower; sepals unequal, erect, connate at base; petals similar or broader; lip erect from the base of the column, around which its lateral lobes are folded, the limb spreading, concave, undulated or fimbriate, undivided or two-lobed; column elongated, slightly incurved, semi-terete; bracts appressed. Leaves scattered, coriaceous, plicate-veined, sessile in the sheaths. The best-known species are here described. "The East Indian or Mexican house will either of them

**Sobralia**—*continued.*

suit these plants, which thrive best in pots of large size, potted in rough, fibrous peat . . . which should overlie about 3in. of drainage. An abundant supply of water at the roots in the growing season is essential to their well-being, but afterwards much less will suffice. The stems grow up in thick tufts; and when the plants get too large, they should be turned out of the pot, and divided into several pieces, each of which will soon grow and make a flowering plant. The genus is far too much neglected by orchid-growers" (B. S. Williams).

**S. Cattleya** (Cattleya-like). \* *f.* resembling those of a Cattleya; sepals and petals purplish-brown; lip purplish, with three yellow, crested keels, forming a sharp angle by its lateral lobes overlapping the column; inflorescences several, lateral. *l.* oblong, acuminate, plaited, shining. Stem stout. Columbia, 1877. A plant of great beauty.

**S. chlorantha** (yellow-flowered). *f.* yellow, whole-coloured, fully 4in. long, sessile; lip obovate, the disk striated, the margins undulated, a pair of deep lamellæ extending from the base to the apex. June. *l.* very fleshy, hardly plicate, loosely striated, oblong; upper ones changed to ovate, cuneulate bracts. *h.* 1ft. Brazil, 1852. (B. M. 4682; F. d. S. 840.)

**S. decora** (comely). "This differs from *S. sessilis*, not only in being perfectly free from the black hairiness characterising that species, but also in being a smaller plant, with a truly cuneate lip, in having whitish flowers with a rose-coloured lip, and the petals overlaying the sepals, so that the back of the former answers to the face of the latter" (Lindley). Guatemala, 1856. (B. M. 4570 and L. J. F. 104, under name of *S. sessilis*.)

**S. dichotoma** (dichotomous). \* *f.* white outside, violet within, sometimes whitish-rose with a rose and purple lip, or the whole deep red, fleshy; lip cuneulate, three-lobed, the lateral segments entire, the middle one emarginate, crisped, crested-lacinate at apex; racemes lateral, drooping, dichotomous, flexuous, many-flowered. March. *l.* hard, plicate, acuminate, narrowed at base. Stems 6ft. to 20ft. high, resembling bamboos. Peru. A grand species.

**S. fragrans** (fragrant). *f.* in pairs, 1½in. long, deliciously scented; sepals externally dirty purplish-green, keeled; petals pale yellow, thin, flat, lanceolate; lips of a brighter yellow, the middle lobe deeply fringed and furnished with nine lacerated crests. July. *l.* very smooth, rather fleshy, perfectly naked, with a short, keeled sheath. Stem two-edged, scarcely 1ft. high. New Grenada, 1854. (B. M. 4882.)

**S. leucoxantha** (whitish-yellow). *f.*, sepals white, recurved, oblong-ligulate; petals white, rather shorter and broader; lip white outside, deep golden-yellow, flushed with orange in the throat and disk, passing off to white at the edge, oblong-lanceolate, convolute at base, the expanded front portion bilobed and crenulate; bracts of the spathe scarious, spotted with brown. August. *l.* plicate, cuneate-oblong, long-acuminate, the sheaths warted. Stems 1ft. or more high. Costa Rica.

**S. Liliastrum** (Star-Lily). *f.* white, veined with yellow, large, pendulous; racemes terminal, distichous, many-flowered, with spathaceous bracts. July and August. *l.* lanceolate, very acute, striated, sheathing at base. Stems 8ft. to 10ft. high. British Guiana, Brazil, 1840. (L. S. O. 29.) *SYN. Epidendrum Liliastrum*.

**S. L. rosea** (rose-coloured). *f.*, petals and lip of a rich rose-colour, the latter veined with white.

**S. macrantha** (large-flowered). \* *f.* beautiful rich purple and crimson, aromatic, 6in. across; sepals oblong; petals broader, crisped in the upper part; lip folded round the column at base, very broad and bilobed at the apex, wavy at the edges, having a pale yellowish spot in the centre; racemes short. Summer. *l.* ovate, acuminate, plicate. Stems 6ft. to 8ft. high. Mexico and Guatemala, 1842. The finest species of the genus. (B. M. 4446; F. d. S. 669; P. d. B. xiv. 241.)

**S. m. albidia** (whitish). *f.* of a very pale rose-colour. (G. C. 1871. p. 906.)

**S. m. nana** (dwarf). *f.* smaller than in the type; lip dark violet, yellow at the base. A dwarf variety.

**S. m. purpurea** (purple). *f.* of a rich purple.

**S. m. splendens** (splendid). *f.* darker than those of the type, but not so large. June to August, 1846. A charming variety. "WOOLLEY'S" variety is a very dwarf form of this, producing splendid flowers in June and July.

**S. rosea** (rose-coloured). \* *f.* very large; sepals and petals dark mauve; lip crimson, with a white centre, very open; raceme short, the rachis flexuous; bracts boat-shaped, large. *l.* ovate, acuminate. Stems about 4ft. to 6ft. high. Peru and New Grenada. A fine species; the spikes have four flowers, all opening at once. *SYN. S. Ruokeri* (R. X. O. i. 43; W. S. O. iii. 19).

**S. Ruokeri** (Rucker's). A synonym of *S. rosea*.

**S. sessilis** (seaside-flowered). *f.* deep rose-colour, the lower half of the lip tinged with yellow, solitary, sessile; lip rhomboid-oblong, bilamellate at base; bracts none or only a few, leafy at apex. December. *l.* beneath (as well as the stems) covered with dark pubescence. British Guiana, 1840. (B. R. 1841, 17.)



VANDA INSIGNIS AND VAR. SCROEDERIANA



**Sobralia**—continued.

**S. suaveolens** (sweet-smelling). *fl.* yellowish-white, richly perfumed; lip white, brown on the disk of the front lobe, the keels yellow. Central America, 1878. This species is very similar in habit to *S. decora*.

**S. violacea** (violet). *fl.* pale violet, larger than those of *S. decora*; lip convolute, not unlike that of a Cattleya; bracts imbricated, somewhat leafy. July. *l.* hard, lanceolate, deeply plicate; sheaths slightly warty. New Grenada. Plant larger than *S. decora*. There is a variety having white flowers, with a yellow disk to the lip.

**S. xantholeuca** (yellowish-white). *fl.* large and handsome, deflexed; sepals and petals pale yellow, the former oblong-lanceolate, the latter broader and wavy at the edges; lip longer, deeper yellow, much frilled, emarginate. *l.* lanceolate, acuminate, plaited, the sheaths dotted with brown. Native country unknown. (Gn. xxii. 366; W. O. A. vi. 250.)

**SOCRATEA** (named after the philosopher Socrates, the greatest of the Greeks). ORD. *Palmæ*. A small genus (three to five species) of stove, unarmed palms, natives of North Brazil and Columbia. Spathes five to eight, deciduous, the upper ones complete; spadices solitary, horn-like and recurved before flowering. Fruit ellipsoid or oblong-obovoid, one or rarely two-seeded. Leaves few, terminal, equally pinnatisect; segments oblique, cuneate-fabellate, deeply laciniate, the laciniæ narrow, sinuate-toothed. Only one species calls for mention here. Its aerial roots are studded with small spines, used by the Indians as a Cassava grater. For culture, see **Iriartea**.

**S. exorhiza** (rooting outwards). Zanon Palm. *fl.* spathes five or six, deciduous; spadix 1½ ft. long, spreading when flowering, pendulous in fruit. *fr.* yellowish or yellowish-green, scarcely fleshy, ovate-elliptic, eight to twelve lines long. *l.* 12 ft. to 20 ft. long; pinne oblique, sub-trapezoid, sinuate-toothed, flat; petioles cylindrical, convolute at base. Trunk 60 ft. to 100 ft. high. Aerial roots eight to twenty or more, emerging 6 ft. from the ground. Guiana, Amazons River, 1849. SYN. *Iriartea exorhiza*.

**SODA**. A substance composed of the alkaline metal Sodium, combined with Oxygen, together with a certain amount of water, called Water of Hydration. Sodium is one of the most widely-diffused elements; and its numerous compounds are almost all readily soluble in water. It is very difficult to get entirely clear of the element, even in the chemical laboratory, and it is impossible to do so in soils: hence, plants are constantly supplied with it in solution from the soil, and it is found in the ashes of all plants. Experimental cultivation of plants from which it is, to the utmost, withheld, proves that it is not indispensable to any plant; though it has been asserted that Wheat, Oats, and Barley require an appreciable trace of Sodium to allow them to form perfect seeds. It has also been stated, as a result of experimental cultivation, that Sodium may, in part, functionally replace Potassium in plants; but there seems reason to believe that Sodium produces very little, if any, effect on the health of plants, though indispensable in the nourishment of animals, including man.

**SODIUM CHLORIDE.** See **Salt**.

**SOFT GRASS.** See **Holcus**.

**SOIL.** The comparatively soft and loose upper layer of the earth's crust, upon which plants depend for their nourishment. The various kinds of Soils, and their modes of origin, will be found described below. Soils should be carefully examined as regards their composition and physical properties, in order to ascertain their capabilities for cultivation, the kinds of plants for which they are naturally best fitted, and the means by which they can be rendered more fertile.

**ANALYSIS.** Soils may be examined in the following way, as regards their general composition; and much valuable information can be obtained from such an analysis: The Soil is first thoroughly dried at 212deg. Fahr., and a given weight, say ½ lb., is boiled in distilled water till the particles of which it is made up fall thoroughly apart. The substances in the soil that are soluble in pure water will be dissolved in this way; and

**Soil**—continued.

the solution is carefully filtered through paper into a vessel, and kept for chemical analysis. The solid residue is carefully washed twice or thrice with distilled water, on a filter, to remove the whole of the soluble substances, and the washings are added to the solution. The residue is then thoroughly dried at 212deg. Fahr., and weighed; and the loss, as compared with the previous weight of ½ lb., gives the amount of substances in the soil that are soluble in pure water. The solid material is then again washed, and the water is poured off, carrying with it the lighter particles. This is repeated till only the sand and gravel are left behind: these are dried and separated, by sifting through gauze. The washings, also, are collected and dried. The gravel, sand, and fine particles, which form the clay or mud of soils, are weighed separately, and the relative weight of each is thus determined. Each is then examined with a good lens, and the proportions of pure quartz sand (silica), mica, volcanic rocks, limestone, or other minerals, are noted. This examination is facilitated if a little Hydrochloric Acid (Spirit of Salt) is poured over the material under examination; since quartz sand remains unchanged, limestone is dissolved with the formation of bubbles of Carbonic Acid gas, ironstone is slowly dissolved, and the acid turns brown, and gives the very characteristic test for iron by turning blue when a solution of Prussiate of Potash is mixed with it. Other minerals in Soils give less conspicuous results with the acid. The chemical analysis of the portion soluble in water, and the complete analysis of the solid residue, require a considerable knowledge of chemistry for the attainment of success, and should be entrusted to a professional analyst.

The amount of organic matter, *i.e.*, remains of animals and of plants, in Soils, very greatly affects their value. The fresh Soil must be thoroughly dried, as already stated, to drive off the water as completely as possible. A given weight of it is then burned in a platinum dish, over a lamp, in the open air; and the burning is continued till all the blackness is got rid of, *i.e.*, till the Carbon is entirely burned away. The residue is then carefully weighed again, and the loss of weight represents the amount of organic matter destroyed. It is desirable to ascertain the conditions in which the latter is present in the fresh Soil; but exact analysis demands more experience of chemical manipulation than is usually met with, except among chemists. Organic matter is usually present as Humic and Ulmic Acids (along with small quantities of some other organic acids), and insoluble vegetable matter, including often a good deal of tannin. Nitrates, also, are formed from organic remains.

Those who desire fuller details on the methods of analysis, will find them in most works on Agricultural Chemistry, such as Johnston's "Analysis of Soils," or Johnston and Cameron's "Elements of Agricultural Chemistry and Geology."

**PHYSICAL PROPERTIES.** Not less valuable than the knowledge of the chemical composition of Soils, is that of certain properties grouped under the term heading this paragraph. Of these, the chief are the capacity for absorbing and retaining water, various chemical compounds, and heat; the density and power of cohesion of the particles of Soil, and the mode of shrinkage in dry weather. These vary greatly, according to the composition of the Soil; but their general characters may now be indicated.

**Absorption and Retention of Water.** This is a quality of great importance in fitting the Soil to supply the moisture required by plants. Soils absorb rain; though when the rainfall is very heavy, they cannot absorb more than a part, and the rest flows off the surface into streams. The capacity for absorption of rain-water, and for keeping it stored within reach of the roots of plants,



**Soil—continued.**

varies much in Soils, according to their composition and the size of the particles of which they are made up. Sandy Soils rapidly absorb the water; but they allow it to drain away almost as quickly; so that plants growing in sand are liable to suffer from drought. Fine sand is about twice as retentive of water as coarse. Clay retains twice or thrice as much as sand. Vegetable earth, or humus, absorbs and retains about twice or thrice as much as clay, and becomes about two and a-half or three times as heavy when soaked in water as when dry. The more retentive Soils lose less by evaporation than do the others. Almost all Soils are more or less full of water, in the liquid form, at a few feet below the surface, the depth varying with the nature of the Soil and Subsoil and with the season of the year and the climate. This subterranean water is brought within reach of the roots of plants by what is known as *capillary attraction*, the water rising in the fine crevices between and in the particles of the Soil. If the subterranean water is stagnant near the surface, substances are apt to be formed in the Soil that are injurious to plants, and that thus diminish its fertility. Drainage is usually necessary in claye and peat Soils, to prevent water from accumulating and doing harm in this way.

Certain Soils also have the property of absorbing a good deal of vapour from the atmosphere, and condensing it in their particles, the amount increasing in proportion to the moistness of the air. Experiments have shown that humus can absorb about half its own weight of water from air saturated with vapour; and clays absorb one-tenth to one-fifth of their own weight; but quartz sand absorbs little, if any, moisture in that way. This source of moisture becomes less productive as the temperature rises. During the night, and in cold weather, it is probable that Soils absorb a good deal of moisture from the atmosphere; but when the air is warmer and drier than the soil, the latter loses water by evaporation, and what is lost in this way is replaced from below by capillary attraction. Evaporation cools the surface from which it is going on; hence, wet land is colder than that which is well-drained. Humus gives up least by evaporation, and quartz sand most, of all Soils under similar conditions.

*The Power of Absorbing and Retaining Chemical Compounds* is one possessed to a greater or less extent by all Soils, and is of the utmost importance in the nutrition of plants. If solutions of various kinds (*e.g.*, of Potassic Nitrate or Ammonium Nitrate, or of Phosphates of Potassium, Calcium, &c.) are allowed to trickle through a moderately thick layer of Soil, it is found that the water flowing off contains little of these substances for a time; but at last the Soil becomes saturated with them, and allows the solution to pass through unchanged. By this property of retaining certain compounds, Soils are enabled to store up soluble manures, as well as Ammonia and Nitrates from the atmosphere, and various substances formed in the changes due to weathering of the rocks and Soils; and from this store plants can draw, as they need these substances in their food. Owing to this process, filtering impure water through, or over, a sufficient extent of earth is a very efficient mode of removing impurities, and is frequently resorted to for purifying sewage-water before discharging it into streams.

*The Capacity for Absorbing and Retaining Heat* varies with colour and texture, with the amount of moisture in, and of evaporation from, the Soil, and with the angle of exposure to the rays of the sun, direct or reflected. Of course, the actual temperature depends also upon the amount of protection afforded by buildings or other objects in the neighbourhood.

Bottom-heat is of great use in stimulating the action of roots, but in Great Britain it can be given only in

**Soil—continued.**

hotbeds or hothouses. Exposure to the sun's rays is, therefore, the only source of warmth that need be discussed here. The more directly the rays fall, the greater is their effect. Evaporation keeps down the temperature, and it has been found that wet Soils are usually from 10deg. to 15deg. Fahr. colder than dry ones of the same composition. Hence, draining wet Soils renders them warmer, and hastens the ripening of the crops on them. Dark grey Soils absorb most heat; next come black Soils, then brown and dark red. Pale sands, marls, and clays absorb least. The temperature of the Soil exercises a marked influence on the growth of plants, since they suffer if the buds and leaves are stimulated by a warm atmosphere while the soil is too cold to permit of the roots supplying the necessary sap to the other organs.

*The Density and Power of Cohesion* of the particles of Soils, and the *Mode of Shrinkage*, are of interest and importance chiefly on account of their influence on the capacities of Soils for moisture, chemical substances, and heat. Pure sands show little cohesion, and change little in bulk or form during dry weather. Clays are very coherent, and may lose as much as one-fifth of their bulk by shrinkage during droughts; and peaty Soils shrink even more than clays. Cracks form in these Soils to a considerable depth, and allow evaporation to continue; and roots are broken across, and exposed to the air in the cracks, or are crushed by the shrinkage.

Soils can frequently be much improved by a judicious mixture with others: *e.g.*, sand should be added to clay; clay or peat to sand; lime, clay, and sand to peat.

**ORIGIN.** All Soils are formed in one or other of two ways, either from the weathering and breaking down of rocks, or from the decay of plants or animals, and most of them are produced more or less in both ways; though the former has been the source of by far the greater bulk of all Soils except peat. In some localities, it is not difficult to recognise that the Soils are of the same composition as the rocks on which they lie, and that they are formed by the action of the weather in breaking up the rocks and reducing them to fragments. In course of time, also, the decay of successive generations of plants gives origin to an admixture of humus in almost all Soils. But, in most parts of Great Britain, the Soils are different in composition from the rocks on which they lie, and must have been brought into their present situations from a greater or less distance. That this should be the case in valleys, is easily understood, for the Soil on the slopes is constantly being carried down by showers and streams, and spread over the lower ground. This also occurs on fields or meadows along rivers in the lowlands liable to be overflowed, as the finer particles of mud in the water are deposited on the flooded ground, where free from the action of currents. Frost splits pieces of stone from exposed rocks and cliffs, and causes them to roll down the slopes, and it is also a powerful agent in reducing rocks and stones into the finer particles of which Soils are composed. But a layer of a few inches of earth will protect the rocks very greatly, if not entirely, from the action of the air, rain, and frost; and these agents are not sufficient to account for the amount and depth of soil, or for the relations of the soil to the subjacent rocks, now prevalent over the country, especially in Scotland and in the northern half of England. A far more powerful force than any now existing in Britain was, however, at work during a comparatively recent geological period. This was ice, which, for a long time, covered the land (much as Greenland is covered now) with a continuous sheet. Formed and renewed on the higher tracts of country, it spread down the valleys, and over all but the highest peaks, extended over the lowlands of Scotland and Northern England, and met ice



**Soil**—*continued.*

pushing its way down from the Norwegian mountains into the ocean. Probably, the present German Ocean was then blocked with ice; and ice from Scotland extended over the Isle of Man, the North of Ireland, and the Hebrides, and a considerable distance into the Atlantic Ocean. As the ice pressed down from the hills, its enormous weight ground down the looser and more prominent rocks, and pushed the Soil, loose rocks, and stones, before it in the direction in which it travelled, until they were deposited in hollows, protected behind hills or ridges. As the climate became warmer, the ice diminished, till it did not reach the sea; then it gradually receded in the lowlands, till it became restricted to the mountain valleys; and, finally, it disappeared completely, even from our mountains, leaving its traces only in markings on rocks over which it had passed, and in the mounds of stones and earth (moraines) left behind as the glaciers receded. The Soils formed before the Ice Age were pushed by the ice from the situations in which they had originated, over rocks of a different kind, and were so mixed together as to frequently render it very difficult to trace their sources; but, by this mixing, the Soils have often been much improved—clays, sands, and limestones being mingled, so as to combine their valuable properties.

*Vegetable Earths*, or *Humus*, are formed in great part of the remains of plants, and, to a slight extent, of animals; and along with these is a varying amount of Soils of purely mineral origin (as described above). Cultivated Soil usually contains a good deal of *Humus*, which gives a darker hue the greater the amount of it in the Soil. When the organisms decay in comparatively dry earth, the resulting Soil is known as *Mould*; and any Soil containing more than 6 per cent. of organic remains, is called a *Vegetable Mould*; but the proportion of organic matter is often much higher. These *Moulds* are known as sandy, clayey, or loamy, according to the nature of the mineral Soil mixed with them.

*Peat* is the name given to *Vegetable Earths* formed in the temperate zones, under water, or in swamps saturated with water. It is frequently from 5ft. to 6ft. deep, and in some Irish *Peat-bogs* it even reaches 40ft. in depth. It is formed by the decay of aquatic and marsh plants. *Peat-bogs* seem frequently to have originated in forests, where fallen trees obstructed the drainage of the surface-water. The ground became saturated with water, but the surface of the swamps then, as now, bore a luxuriant vegetation of marsh-plants and Bog-mosses (*Sphagnum*), which decayed below, and formed new *Peat*, while they continued to grow upwards. The *Peat-mosses*, so plentiful in many districts, have been formed chiefly, if not almost wholly, since the Ice Age; they seem to be now wasting away from natural causes, apart from human agency, more rapidly than they are renewed. Newly-formed *Peat* yields in general only 1 or 2 per cent. of mineral substances derived from the plants, and is brown, light, porous, and fibrous. Deeper down, the *Peat* becomes much darker and denser, and gradually loses all traces of its vegetable origin: the ash may reach as much as from 10 to 30 per cent. of its weight. *Peat-bogs* are not adapted for cultivation in their natural condition, although they are the favourite habitat of certain plants, such as many of the *Heaths*, *Rhododendrons*, and allied plants, and although *Peat* is a most useful material in gardening operations, being employed in the Soils prepared for the cultivation of many plants from the Cape of Good Hope and Australia, and many *Monocotyledons*. *Peat* is also an excellent material for steeping in liquid farmyard manure, either in tanks, or as litter, to prevent the manure running to waste, the *Peat* being afterwards used as manure, alone or in composts.

To render *Peat-bogs* fertile, the excess of water must be drained off, and lime, sand, and clay added. The effect

**Soil**—*continued.*

of this treatment is that the Soil is warmed, and the hurtful organic acids are destroyed by the lime; while the lime, sand, and clay, together, render the Soil more open and pervious to gases, and prevent stagnation of water in it. By such treatment, *Peat-bogs* may, in time, be converted into fields or gardens, capable of yielding a good return; but the labour and expense incurred in improvements of this kind are usually considerable.

**CLASSIFICATION.** The chief kinds of Soils have been incidentally mentioned above, but it will be well to recount their more important differences. They may be classed according to their composition as follows:

*Sandy Soils*, with not less than 80 per cent. of pure quartz sand; such as may be met with among the dunes or sandhills, along our coasts. These contain little nourishment for plants, are very liable to suffer from drought, have little cohesion, and are blown about by the winds; they produce light, but early, crops. *Sandy Soils* can be improved by the addition of clay, and lime in the form of marl or of chalk. Turnips often do well in the better class of *Sandy Soils*; and, in wet years, these Soils yield a very fair produce.

*Clay Soils*, chiefly composed of clay (Aluminum Silicate), result from the breaking down of felspars in granites and in rocks of similar composition. They are heavy, dense, and very coherent, and are very retentive of water; but the water is apt to stagnate in them, and to render them late and cold by the amount of evaporation from the surface, near which it remains, there being no crevices for it to pass down. In droughts, plants on *Clay Soils* are apt to suffer, as roots cannot penetrate into stiff clays, or obtain water from the Subsoil. These Soils contain abundance of mineral food for plants; but it is rendered unavailable by their stiff texture. When this is corrected, by the addition of sand, lime, ashes, or suitable manures, and when the stagnant water is removed, by drainage, clays become very fertile.

*Calcareous Soils* contain above 20 per cent. of Carbonate of Lime, in the form of *chalk*, or mixed with clay to form *marls*. These may be dry and friable, or (e.g., marl) may approach the clays in texture. In productiveness they vary greatly. They are less frequent than the two soils already described.

*Peaty Soils* have been discussed above at sufficient length; as have been also the methods of improving them.

*Vegetable Moulds* (*Humus*) vary much in percentages of organic matter contained in them. They belong to the more fertile kinds of Soils, and are retentive of water.

*Gravelly Soils* may belong to any one of the first three classes, seldom to the fourth. The term applies only to the presence of gravel or stones in Soils, without reference to their composition.

*Loamy Soils* are intimate mixtures of all the first four, in which the clay is under 50 per cent., and the lime under 5 per cent. Loams are productive and excellent Soils, being easily cultivated and fertile.

**SOJA.** Included under *Glycine* (which see).

**SOLANACEÆ.** A rather large natural order of herbs, erect or climbing shrubs, or rarely trees, mostly inhabiting the warmer regions of the globe. Flowers hermaphrodite, regular or slightly irregular; calyx five (rarely four, six, or seven) parted, toothed, or lobed, gamosepalous; corolla gamopetalous, tubular, funnel, salver, or bell-shaped, or rotate; limb five (rarely four, six, or seven) parted or lobed, the lobes equal or obscurely bilabiate; stamens alternating with the corolla segments, affixed to the tube; inflorescence usually cymose. Fruit capsular or baccate. Leaves alternate, the upper ones usually twin, in one instance whorled, entire, toothed, lobed or dissected. Of all the plants comprised in this order, the most useful to man is the

**Solanaceæ—continued.**

Potato (*Solanum tuberosum*). Tobacco, the manufactured leaves of several species of *Nicotiana*, principally *N. Tabacum*, is also a highly-important article of commerce. Among other products may be mentioned: Chillies, the berries of *Capsicum annuum*; Cayenne Pepper, the ground fruits of a sub-woody species of *Capsicum*; the Tomato or Love Apple (*Lycopersicum esculentum*), widely cultivated; and the Brinjal, Aubergine, or Egg Plant (*Solanum Melongena*). The principal medicinal properties of *Solanaceæ* are: Belladonna, Henbane, and Stramonium. The fruits of *Solanum quitense*, and other species, are edible. About sixty-six genera and 1200 species are included under *Solanaceæ*. Examples: *Cestrum*, *Lycopersicum*, *Nicotiana*, *Petunia*, *Physalis*, and *Solanum*.

**SOLANDRA** (named in honour of Daniel Charles Solander, LL.D., F.R.S., 1736-1782, a Swede, disciple of Linnæus, and fellow-traveller with Sir Joseph Banks and Captain Cook). ORD. *Solanaceæ*. A small genus (about four species) of tall-climbing, stove shrubs, natives of tropical America. Flowers large; calyx long-tubular, two to five-cleft at apex; corolla funnel-shaped, with an ample, campanulate throat, and a limb of four broad lobes; stamens five, declinate above the middle; pedicels solitary, thick. Berries globose, pulpy. Leaves entire, coriaceous, shining. The species are very handsome subjects when in flower. If allowed abundance of space and moisture, they grow rapidly, but produce no blossoms. In order to avoid this, insert the plants in loamy soil, and encourage them to grow rapidly at first by giving plenty of water; then withhold water altogether until the leaves begin to drop off from drought, and an abundance of flowers will be the result. Propagation may be readily effected by cuttings, inserted in mould or tan. If small flowering plants are desired, the cuttings should be taken from flowering shoots.

**S. grandiflora** (large-flowered). \* Peach-coloured Trumpet Flower. *fl.*, calyx 2 in. to 3 in. long, three or four-cleft; corolla greenish-white, 7 in. to 10 in. long, the lobes undulate-crenate. March and April. *fr.* greenish, ovoid-globose, of a sweet, sub-acid flavour. *l.* elliptic or elliptic-oblong, 2 in. to 5 in. long. *h.* 15 ft. Jamaica, 1781. (B. M. 1874.)

**S. guttata** (spotted). *fl.* erect, terminal; corolla pale yellow, marked with purple spots in the throat, large, funnel-shaped, the lobes crisply crenate, spreading. March. *l.* broadly elliptic-oblong, 3 in. to 6 in. long, acute, downy beneath. *h.* 10 ft. Mexico, 1830. (B. R. 1851.)

**S. lævis** (smooth). *fl.* fragrant; calyx 4 in. long, tubular, two-tipped at the extremity; corolla greenish-cream-colour, white at the limb, nearly 1 ft. long, slender below, bell-shaped above, the limb spreading, of five singularly crisped and waved lobes; peduncles thick, 1 in. long. November. *l.* alternate, oblong-oval or somewhat obovate, acute, paler beneath, small in proportion. Branches spreading, 2 ft. long. South America, 1846. (B. M. 4345.)

**S. longiflora** (long-flowered). *fl.*, calyx about 3 in. long; corolla white, with a purplish tinge, 1 ft. long, the lobes undulately toothed. November. *fr.* 1 in. in diameter. *l.* elliptic, lanceolate, or obovate-oblong, 2 in. to 4 in. long. *h.* 6 ft. Jamaica, 1846.

**S. viridiflora** (green-flowered). \* *fl.* green, terminal, solitary, pedunculate; calyx segments five, acute; corolla drooping, the segments elongated and revolute. May to July. *l.* elliptic-oblong, attenuated at both ends, acuminate, glabrous. *h.* 2 ft. to 3 ft. Brazil, 1815. Deciduous. (B. M. 1948.) *Dissochroma viridiflora* is now the correct name of this plant.

**SOLANUM** (the old Latin name, used by Pliny). Nightshade. Including *Aquartia* and *Nycterium*. ORD. *Solanaceæ*. An immense genus (upwards of 900 species have been described, but not more than 700 are distinct as such) of spiny or unarmed, stove, greenhouse, or hardy shrubs, herbs, or small trees, of very variable habit; they are mostly confined to the hotter parts of the globe, and are especially abundant in America. Flowers yellow, white, violet, or purplish; calyx campanulate or spreading, five or ten-toothed, lobed, or parted, rarely four-parted; corolla tube very shortly rotate or rarely broadly campanulate, the limb five (rarely four or six) lobed, plaited in bud; stamens five, rarely

**Solanum—continued.**

four or six, affixed to the throat; filaments very short; cymes dichotomous or racemose, lateral or terminal. Berry globose or elongated. Leaves alternate or sub-opposite in equal pairs, entire, lobed, or pinnatisect. The most important species in the genus is *S. tuberosum*, which has been exhaustively treated in this work under its common name, **Potato**. For the most recent conclusions respecting this species and the origin of the Potato, see the papers published in vol. xxvi. of the "Gardeners' Chronicle." *S. Melongena* furnishes the fruit known as **Aubergine** (which see), and the berries of several other species are edible. *S. Dulcamara* (Bittersweet) and *S. nigrum* are British plants. *Solanums* succeed in almost any rich, loamy soil. The annuals, and a large proportion of the other species, may be readily raised from seeds. Those which bear tubers may be increased thereby; and the stove and greenhouse shrubby plants may generally be propagated from cuttings, inserted, when young, in a warm propagating frame. For sub-tropical gardening, *S. marginatum*, *S. robustum*, and *S. Warscewiczii* are invaluable; *S. Capsicastrum* and *S. Pseudocapsicum* are popular plants for greenhouse decoration when covered with their bright-coloured berries. Out of twenty tuber-bearing species which have been named, J. G. Baker (in the "Journal of the Linnean Society," vol. xx.) is of opinion that "six, viz.: *S. tuberosum*, *S. Maglia*, *S. Commersoni*, *S. cardiophyllum*, *S. Jamesii*, and *S. oxycarpum*, possess a fair claim to be considered as distinct species in a broad sense." A large number of the species have been introduced to cultivation, and many of them are highly deserving of a place in the garden, on account of their ornamental appearance. Except where otherwise indicated, those described below are shrubs. All flower in summer.

**S. acanthodes** (spiny). \* *fl.*, calyx hemispherical, bristly; corolla pale blue-purple, nearly flat, lobed to about the middle, 2 in. in diameter, the margins waved; cymes lateral, scorpioid, six to ten-flowered. *l.* 1 ft. or more long, ovate or obovate-oblong, pinnatifidly lobed to the middle or lower, deeply two-lobed at base; lobes horizontal, sinuate, sub-acute; midrib and horizontal nerves orange-red, and, as well as the petioles, prickly. Stem and branches dark green and bright orange, prickly. *h.* 3 ft. to 6 ft. Brazil, 1863. Stove. (B. M. 6283.)

**S. æthiopicum** (African). *fl.*, calyx leafy, five to seven-cleft; corolla white, deeply five to seven-cleft, the segments triangular-oblong; racemes few-flowered, drooping. *fr.* red, large, globose, edible. *l.* ovate-lanceolate, repand-angled, solitary or twin, petiolate, 5 in. long, very unequal at base, acuminate, paler beneath. Stem 1 ft. to 2 ft. high. Africa, 1597. Hardy annual.

**S. amazonium** (Amazon). *fl.*, calyx five-cleft; corolla blue, with five yellow rays on the outside, five-cleft, 2 in. in diameter; pedicels one-flowered; peduncles 1 in. long; racemes cymose, terminal or lateral, nearly 2 in. long. *l.* solitary, above twin, rarely ternate, petiolate, spreading, 4 in. to 5 in. long; lower ones larger, sometimes 6 in. long, sparsely prickly on the nerves and petioles. Stem unarmed. *h.* 3 ft. to 4 ft. Mexico, 1800. Stove. (B. R. 71; L. B. C. 352.) SYN. *Nyctetrium amazonicum* (B. M. 1801).

**S. Anguivi** (Anguivi). A synonym of *S. indicum*.

**S. anthropophagorum** (man-eating). Cannibal's Tomato. *fl.* small; calyx five-lobed; corolla white, rotate, pubescent; pedicels few, drooping. *fr.* red, resembling tomatoes, obscurely two-lobed, nipped at apex. *l.* glabrous, ovate, acuminate, entire or (the lower ones) angularly lobed, long-petiolate. *h.* 6 ft. Fiji. Stove. The berries of this species were formerly eaten by the natives with human flesh. (B. M. 5424.)

**S. asarifolium** (Asarum-leaved). *fl.*, calyx truncately five-toothed; corolla whitish, rotate, five-lobed; peduncles sub-axillary, solitary, one-flowered. *l.* twin, very unequal, membranous, glabrous; one petiolate, ovate-cordate, rounded at apex, entire, slightly ciliated; the other sessile, minute, orbicular. Stem creeping, branched. Venezuela, 1870. Stove perennial. (Ref. B. 255.)

**S. atropurpureum** (dark purple). \* *fl.*, calyx tinged with purple, deeply five-cleft; corolla diluted with yellow, somewhat five-parted, the segments acuminate, four lines long; racemes lateral, six to eight-flowered, nearly 1 in. long. *fr.* white, at length yellow. *l.* 6 in. to 7 in. long, long-petiolate, unequally sub-cordate, five to seven-parted, armed with robust prickles nearly 1 in. long. Stem erect, branched, dark blood-colour; prickles unequal, dark purple at base. *h.* several feet. Brazil, 1870. Greenhouse sub-shrub. (Ref. B. 207.)

**S. aviculare**. Bird Solanum; Kangaroo Apple. *fl.* few, in short, loose, pedunculate racemes; calyx lobes short; corolla violet, 1 in.

**Solanum**—continued.

to lin. in diameter, very shortly and broadly lobed. *fr.* green or yellow, rather large. *l.* lanceolate, acute or rarely almost obtuse, mostly entire on old specimens, often pinnatifid, the larger ones 6 in. to 10 in. long. *h.* 5 ft. to 6 ft. Australia and New Zealand, 1772. An erect, greenhouse shrub or sub-shrub. (B. M. 349, under name of *S. laciniatum*.)

**S. Balbisii** (Balbis). A synonym of *S. sisymbriifolium*.

**S. betaceum** (Beet-leaved). A synonym of *Cyphomandra betacea*.

**S. campanulatum** (bell-shaped). *fl.*, calyx four to five lines long; corolla violet or blue, broadly campanulate or almost rotate, lin. in diameter, very shortly lobed; racemes loose, lateral. *fr.* 3 in. to lin. in diameter. *l.* petiolate, ovate, sinuate-lobed, with short, broad lobes, or rarely more deeply pinnatifid, 2 in. to 4 in. long. *h.* 2 ft. to 3 ft. Australia, 1836. A prickly, greenhouse herb or under-shrub. (B. M. 3672.)

**S. Capsicastrum** (Star Capsicum).\* *fl.* similar to those of *S. Pseudo-capsicum*, disposed in short racemes nearly opposite the leaves. *fr.* scarlet, about the size of a hazel nut. *l.* twin, one being much smaller, all pinninerved, entire or slightly repand; the larger one oblong-lanceolate, 1½ in. to 2 in. long; the smaller one lanceolate or obovate. Stem branched. *h.* 1 ft. to 2 ft. Brazil. Greenhouse sub-shrub, very ornamental when in fruit. (F. d. S. 1242.) There is a variegated form of this species.

**S. cardiophyllum** (heart-leaved). *fl.*, calyx cyathiform, five-toothed; corolla cream-coloured, five-parted, the segments triangular, flat, acuminate, at length revolute; cymes few-flowered, terminal. *l.* auriculate, pinnate; leaflets two or three pairs, not interrupted, somewhat round-cordate, slightly fleshy. *h.* 3 ft. Mexico, 1846. Hardy, tuberous perennial; at present not in cultivation in Britain. (J. H. S. iii. 71.)

**S. ciliatum** (ciliated). *fl.* nodding; calyx deeply five-cleft; corolla white, five-parted, nine to eleven lines across; racemes short and few-flowered; peduncles solitary or twin. *fr.* pure scarlet, globular, nearly as large as a Tangerine orange. *l.* petiolate, ovate-oblong, sinuate-lobed; lobes usually five, sometimes three or seven, ovate, acute, entire or repand, prickly. Stem 1 ft. to 1½ ft. high, straight, branched, very prickly. Porto Rico, 1871. Greenhouse annual. (F. M. 521; F. d. S. 1988.)

**S. Commersoni** (Commerson's). *fl.* in loose, compound cymes; calyx teeth as long as the tube; corolla pale lilac or white, ½ in. to 1 in. long. *l.* sometimes, but not always, pseudo-stipitate, 5 in. to 6 in. long; leaflets five to nine, oblong, acute or often obtuse, the terminal one much the longest, the lowest pair much dwarfed; petioles lin. to 1½ in. long. Rootstock bearing copious large tubers. *h.* 2 ft. Brazil, 1822. Hardy perennial. (R. G. 1885, p. 368, and R. H. 1883, pp. 498, 499, under name of *S. Okrondi*.)

**S. corniculatum** (horned). A garden synonym of *S. cornigerum*.

**S. cornigerum** (horn-bearing). *fl.* erect; calyx small; corolla violet, star-shaped, three or four times longer than the calyx; racemes terminal, loose, few-flowered. *fr.* yellow, pendent, ovate-conical, bearing five blunt, conical, horn-like appendages. *l.*, cauline ones 1½ in. long, trisected, the segments marcescent, caducous; those of the branches sessile, cordate, ovate-oblong, acuminate, nearly triangular. Brazil, 1868. Stove climber. (R. H. 1868, 33.) SYN. *S. corniculatum* (of gardens).

**S. crinitum** (hairy). *fl.*, calyx five-parted; corolla white, 1½ in. to 2 in. in diameter; racemes lateral, cymose, nearly simple, 4 in. long. *fr.* silky-villous, seven lines long. *l.* petiolate, broadly ovate, 1 ft. to 2 ft. long, unequally cordate, undulated, sinuate-lobed, hairy, purple-veined; lobes short, slightly acute, tomentose-woolly on both sides, yellowish-green and unarmed above, whiter and prickly beneath. Stem and branches armed with many prickles. *h.* 4 ft. to 5 ft. Cayenne. Greenhouse.

**S. crispum** (curled)\*. Potato-tree. *fl.* fragrant; calyx five-toothed; corolla bluish-purple, five-cleft, eight to ten lines in diameter; corymbs 3 in. to 3½ in. long, terminal, at length lateral. *fr.* yellowish-white, as large as peas. *l.* simple, undivided, entire or slightly repand, petiolate, ovate, ovate-lanceolate, or sub-cordate, 3 in. to 4 in. long, often cuspidate at apex, loosely crisped on the margins. Stem sub-shrubby, broadly diffuse; branches herbaceous. Chili, 1824. A very showy, hardy plant, growing 12 ft. to 14 ft. high against a wall. (B. M. 3795; B. R. 1516; L. B. C. 1959; P. M. B. iii. 1.)

**S. c. ligustrinum** (Privet-leaved). *fl.* in glabrous, few-flowered corymbs. *l.* sub-cordate, 1½ in. long, highly glabrous. Branches terete, glabrous, green. Chili, 1831. (L. B. C. 1963, under name of *S. ligustrinum*.)

**S. cyananthum** (blue-flowered). *fl.*, calyx much spreading, five-parted; corolla blue, 2 in. to 2½ in. in diameter; peduncles 2 in. long, whitish, prickly, hairy; racemes nearly 4 in. long, about five-flowered. *l.* petiolate, cordate, ovate-elliptic, undulated, 1½ in. long, almost unarmed, sinuate-repand or sinuate-lobed; petioles 2½ in. to 3 in. long, sub-terete, villous. Branches stellate, villous, whitish, prickly, and hairy. *h.* 6 ft. Brazil, 1880. Greenhouse.

**S. Dulcamara**. Bittersweet; Dulcamara; Felon-wood; Woody Nightshade. *fl.* many, drooping; calyx lobes obtuse; corolla purple or white, ½ in. in diameter, the lobes revolute; cymes paniced, leaf-opposed or lateral. *fr.* red, rarely yellow-green, ½ in. in diameter. *l.* ovate or cordate, sometimes three to five-parted, 1 in. to 3 in. long, acuminate. Stem 4 ft. to 6 ft. long,

**Solanum**—continued.

trailing. Europe (Britain), &c. Perennial. (B. M. Pl. 190; F. D. 607; Sy. En. B. 930.)

**S. D. marinum** (sea-loving). *l.* fleshy. Stem prostrate, branched. South Coast.

**S. esculentum** (edible). A synonym of *S. Melongena*.

**S. etuherosum** (non-tuberous). A form of *S. tuberosum*.

**S. Fontanasianum** (Fontaines'). *fl.*, calyx urceolate, five-cleft; corolla yellow, scarcely regular, nine to ten lines in diameter, semi-five-cleft, the segments cuspidate, woolly-villous outside; racemes three or four-flowered, nearly 2 in. long. *l.* petiolate, sub-pinnatifid, 6 in. long; lobes unequally sinuate, ½ in. to 2½ in. long, hairy and prickly on both sides; prickles yellow, 2 in. to 5 in. long. Stem rigid. *h.* 4 ft. Mexico, 1813. Hardy annual, armed with recurved prickles. (B. R. 177.)

**S. fragrans** (fragrant). A synonym of *Cyphomandra betacea*.

**S. giganteum** (gigantic).\* *fl.*, corolla blue, ½ in. in diameter, the tube nearly as long as the lobes; cymes terminal, densely many-flowered, stellately white-woolly. *l.* oblong, cuneate at both ends, 8 in. long, undulated. Stem thick, soft, prickly, stellately white-woolly. *h.* 10 ft. to 25 ft. India, 1792. Plant sub-arboreous. Greenhouse. (B. M. 1921.)

**S. glaucophyllum** (glaucous-leaved). A garden synonym of *S. glaucum*.

**S. glaucum** (glaucous). *fl.*, calyx cyathiform, five-cleft; corolla blue, star-shaped, ten to eleven lines in diameter; corymbs terminal, at length lateral, 3 in. long, sub-trichotomous. *l.* very shortly petiolate, lanceolate-oblong, acuminate, 5 in. to 6 in. long, glaucous, white-margined; petioles whitish, wing-margined. Stem erect, simple, smooth, glaucous. *h.* 6 ft. Buenos Ayres, 1880. Stove perennial. (B. H. iii. p. 165.) SYN. *S. glaucophyllum* (of gardens).

**S. Hookerianum** (Hooker's). *fl.*, calyx of four deep segments, the lower evidently formed of two, cohering at the margin; corolla blue, eight to sixteen lines in diameter, five-cleft, the lobes shorter than the tube; cymes corymbiform, one or few-flowered. *fr.* dark blue. *l.* lanceolate or elliptic-oblong, rather blunt, 1½ in. to 4 in. long, tapering into the short petioles, entire. Stem unarmed. *h.* 4 ft. to 7 ft. Mexico, 1793. A very variable, stove shrub. (B. M. 2708, under name of *S. coriaceum*.)

**S. hybridum** (hybrid). *fl.*, corolla pale blue, five-cleft, seven to eight lines across; cymes or umbels sessile or shortly pedunculate. All the year. *l.* persistent, ovate-cordate, sinuate-repand, 3½ in. to 4 in. long, including the petioles, stellate-tomentose, almost unarmed. Stems suffruticose. *h.* 2 ft. Mexico, &c. Stove.

**S. indicum** (Indian). *fl.*, calyx lobes ½ in. long; corolla blue, ½ in. to lin. in diameter, the lobes broadly triangular, tomentose outside; racemes lateral, many-flowered; peduncles short, extra-axillary. *fr.* yellow. *l.* ovate, sinuate or lobed, 5 in. to 6 in. long, stellately woolly beneath, prickly on the nerves; petioles lin. long. *h.* 1 ft. to 6 ft. India, China, and Malaya, 1732. A very prickly, much-branched, stove under-shrub. SYN. *S. Anguini* (H. E. F. 199).

**S. Jamesii** (James'). *fl.*, corolla white, the segments lanceolate-deltoid, equalling the tube; cymes few-flowered. *fr.* globose. *l.* distinctly petiolate; leaflets nine to eleven, oblong-lanceolate, acuminate. Stem short, slender. Tubers minute. *h.* 9 in. South-western United States and Mexico, 1884. Hardy perennial. (B. M. 6766.)

**S. jasminoides** (Jasmine-like).\* *fl.*, calyx short, five-toothed; corolla bluish-white, nine to ten lines in diameter, deeply five-cleft, spreading; racemes 1 in. to 1½ in. long, about ten-flowered. *l.* petiolate, mostly sub-cordate, ovate-acuminate, entire or sub-repand, rounded at base, 1½ in. long, sometimes two to five-cleft or parted, and 2 in. to 2½ in. long. Stems many, 3 ft. to 4 ft. long, twiggly, sarmentose, leafy. South America, 1838. Greenhouse, deciduous twiner. (B. R. xxxiii. 33; P. M. B. vii. 5.) The variety *foliis variegatis* has leaves blotched with creamy-white.

**S. laciniatum** (torn). A synonym of *S. aviculare*.

**S. lanceolatum** (lanceolate-leaved). *fl.*, calyx five-cleft; corolla blue, 1 in. in diameter, semi-five-cleft, the segments ovate-triangular; cymes, or cymose corymbs, 1 in. to 4 in. long, unarmed. *fr.* orange-coloured, erect, globose. *l.* lanceolate or oblong-lanceolate, 6 in. to 9 in. long, acuminate, acute, unequal at base, obscurely greenish-caescent above; petioles five to ten lines long. Stem 6 ft. or more high, with a few short, straight prickles. Mexico, 1800. Stove. (B. M. 2173.)

**S. lycioides Iodasterum** (Lycium-like). *fl.*, calyx five-parted; corolla angular, violet, yellow within, with a five-rayed, dark purple star; peduncles filiform, bearing one flower, axillary. *l.* elliptic, obovate-elliptic, or ovate-lanceolate, entire, cuneate at base, shortly decurrent into the petioles, paler beneath, ½ in. to 1½ in. long. Branches numerous, spiny. *h.* 4 ft. Peru, 1791. Stove. (B. R. xxxii. 25, under name of *S. lycioides*.)

**S. macrantherum** (large-anthered). *fl.* sub-corymbose, long-pedicellate; calyx sinuately five-lobed; corolla violet, with a five-parted limb 1 in. to 1½ in. in diameter; anthers brown, thick, ½ in. long; panicle solitary, 5 in. to 9 in. long. *fr.* red, globose, 1 in. in diameter. *l.* long-petiolate, ovate, acuminate, rounded or sub-cordate at base, entire or sub-repand, hairy-pubescent, 3 in. to 5 in. long. Stems climbing, woody. Mexico, 1838. Greenhouse. (B. R. xxvii. 7.)

**Solanum—continued.**

**S. macranthum** (large-flowered). A synonym of *S. maroniense*.

**S. Maglia** (Maglia). *fl.*, corolla white, the segments short, deltoid; style elongated. *l.* distinctly petiolate; leaflets few-jugate, ovate, acute. Tubers large. *h.* 1 ft. to 1½ ft. Chili and Peru, 1862. Hardy perennial. This is, in all probability, merely a geographical form of *S. tuberosum*. (B. M. 6756.)

**S. marginatum** (margined).\* *fl.*, calyx five or six-cleft, prickly or unarmed; corolla white, with a small, purple centre, five or six-

**Solanum—continued.**

**S. Melongena** (Meloogena).\* Bringall or Brinjal; Egg Plant; Jew's Apple; Mad Apple. *fl.*, calyx lobes ½ in. to ¾ in. long; corolla blue, 1 in. to 1½ in. in diameter, shortly lobed, hairy on the plaits without; cymes lateral, few-flowered. *fr.* white, yellow, or dark purple, ellipsoid or elongated, 1 in. to 9 in. in diameter, edible. *l.* ovate, sinuate or lobed, 3 in. to 6 in. long, stellately woolly beneath, prickly, rarely all unarmed. *h.* 2 ft. to 8 ft. Native country uncertain (widely cultivated throughout the tropics and frequently semi-naturalised). 1697. Greenhouse annual. *SYN.* *S. esculentum*. There are several garden varieties of



FIG. 498. SOLANUM MARONIENSE.

cleft, outside, as well as the peduncles and pedicels, snowy-tomentose. *fr.* yellow, pendulous, globose, 1 in. or more in diameter. *l.* sub-cordate, sinuate-lobed, prickly on both sides, snowy-tomentose beneath, whitish-margined above. Stem erect, 3 ft. to 4 ft. high, snowy-tomentose, prickly. Abyssinia, 1775. Greenhouse. (B. M. 1928.)

**S. maroniense** (Maroni River).\* *fl.*, calyx ½ in. to ¾ in. in diameter, unarmed or prickly; corolla bluish-violet, five or six-cleft, 1½ in. to 2½ in. in diameter, the segments acute; racemes cymose, 1 in. to 5 in. long, seven to twelve-flowered. *l.* solitary, sub-sessile, attenuated into winged petioles 10 in. to 15 in. long, cuneate, ovate, lanceolate, or lanceolate-elliptic, sinuate-angled or sinuate-lobed; lobes nine or ten, entire or sub-repand, prominently prickly on the veins. Stem prickly, branched at apex. *h.* 6 ft. to 14 ft. Brazil. Stove. See Fig. 498. (B. M. 4133, under name of *S. macranthum*.)

this; the following are two of the best: CHINESE BRINJAL, fruit white, long, very juicy, less fibrous than other sorts; LARGE PURPLE, fruit sometimes as much as 6 in. or 7 in. long, and 1 ft in circumference. See also **Aubergine**.

**S. myrtifolium** (Myrtle-leaved). *fl.*, corolla blue, five-parted, the segments broadly ovate, undulated, acute; racemes short, lateral. *l.* lanceolate, glabrous, attenuated at both ends. Branches terete, green. *h.* 3 ft. South America. Greenhouse. (L. B. C. 1431.)

**S. nigrum** (black). Hound Berry. *fl.* few, drooping; calyx lobes obtuse; corolla white, ½ in. to ¾ in. in diameter, the lobes ciliated, recurved; cymes lateral, umbellate. *fr.* black, yellow, or red, ½ in. in diameter. *l.* rhomboid-ovate, narrowed into the petioles, 1 in. to 3 in. long, sinuate or toothed. Stem erect, 6 in. to 2 ft. high, usually tubercled. Europe (Britain), &c. Annual. (Sy. En. B. 931.)

**Solanum—continued.**

- S. n. miniatum** (scarlet). *fr.* scarlet. *l.* toothed. Kent. (Sy. En. B. 932.)
- S. oxycarpum** (sharp-fruited). *fl.* borne in loose, few-flowered cymes. *fr.* ellipsoid, cuspidate. *l.* distinctly petiolate; leaflets nine to eleven, oblong-lanceolate, acuminate. Stem short and slender. Tubers minute. Mountains of Central Mexico. Hardy perennial. This species is not in cultivation.
- S. platanifolium** (Plane-leaved). *fl.*, calyx small, five-cleft, prickly in fruit; corolla dilated with violet, seven to eight lines in diameter, five-parted; peduncles usually one-flowered, unarmed. *fr.* beautifully variegated with green and white, at length yellow, 1½ in. in diameter. *l.* petiolate, five-lobed, ¾ in. long; lobes irregularly incised, ciliated on the margins. Stem hairy, sparsely prickly. *h.* 3 ft. to 4 ft. Northern South America. (Greenhouse sub-shrub. (B. M. 2618.)
- S. Pseudo-capsicum** (false Capsicum)\* Jerusalem Cherry. *fl.*, corolla white, five-parted; pedicels solitary or few in a lateral fascicle; common peduncle scarcely any. *fr.* scarlet, rarely yellow, globose, about ½ in. in diameter. *l.* oblanceolate or oblong, often repand, bright green and shining, narrowed at base into short petioles. *h.* 4 ft. Madeira, 1596. Greenhouse. A few handsome hybrids have been raised from this species.
- S. P.-c. rigidum** (rigid). *fr.* bright orange-colour, globose. A fine, ornamental, garden hybrid. 1868.
- S. P.-c. Weatherilli** (Weatherill's). *fr.* bright orange-coloured, oval, pointed. *l.* strongly veined, wavy. 1868. A handsome shrub.
- S. pyracanthum** (fire-thorn)\* *fl.*, calyx five-cleft; corolla bluish-violet, lin. in diameter, the segments cuspidate; peduncles 2 in. long; racemes cymose, simple, many-flowered. *l.* petiolate, oblong, acuminate, acute, unequal at base, 5 in. to 6 in. long, pinnatifid, the lobes ovate-lanceolate. Stem 3 ft. to 6 ft. high, terete, leafy. Madagascar, 1789. A handsome, greenhouse, prickly sub-shrub. (B. M. 2547; F. d. S. 2411.)
- S. quercifolium** (Oak-leaved). *fl.*, calyx five-toothed; corolla violet, four or five times longer than the calyx, five-cleft, the segments acute; racemes terminal, at length lateral, 2 in. to 3 in. long. *l.* imparipinnatifid, slightly glabrous, five to seven-lobed, decurrent into the petioles, slightly ciliated, 2½ in. to 3½ in. long; lobes ovate-oblong, obtuse or acute. Stem 3 ft. to 5 ft. high, scabrous. *h.* 2 ft. Peru, 1787. Hardy perennial.
- S. quitense** (Quito). *fl.* pedicellate, clustered; calyx seven to eight lines in diameter, five-cleft; corolla violet and woolly outside, white within, nearly lin. in diameter, five-parted; racemes lin. long, four or five-flowered. *fr.* globose, the size of a small orange, fragrant, edible. *l.* cordate, sinuate-angled; lower ones 1½ to 1½ in. long; upper ones in pairs, one being much smaller; all softly woolly; petioles very hairy, 2 in. to 2½ in. long, ochraceous-rufescent. Stem suffrutescent. *h.* 4 ft. to 6 ft. Peru. Greenhouse. (B. M. 2759.)
- S. robustum** (robust)\* *fl.* clustered; calyx cyathiform, nearly five-parted; corolla white, ovoid, lin. in diameter, five-parted; racemes 1½ in. to 2 in. long. *fr.* globose, hairy, ferruginous-orange. *l.* ovate-elliptic, acuminate, sinuate-lobed, green and tomentose velvety above, ochraceous-ferruginous and woolly-tomentose beneath, prickly on both sides, 5 in. to 8 in. or more long. Branches robust, densely woolly-tomentose, prickly. *h.* 2 ft. to 4 ft. Brazil, 1868. A vigorous and highly ornate, sub-arborescent plant, well suited for the sub-tropical garden. (Ref. B. 37.)
- S. runcinatum** (runcinate). *fl.* drooping, forming a compound cyme; corolla bright purple, with five blood-red, starry points radiating from the base of the lobes; anthers yellow, large. *l.* alternate, 2 in. to 3 in. long, with five or nine undulated segments, waved at the margins, but otherwise entire. Stems procumbent or ascending. *h.* 2 ft. Chili, 1839. Greenhouse perennial. (B. M. 5222; S. B. F. G. ser. ii. 177.)
- S. saponaceum** (soapy). *fl.*, calyx cyathiform, deeply five-cleft; corolla bluish-violet or white, thrice as long as the calyx, deeply five-cleft, ¾ in. in diameter; corymbs 2 in. to 3 in. long and broad, dichotomous. *fr.* orange, globose. *l.* petiolate, linear-oblong, entire. Stem erect, branched, with a few remote prickles. *h.* 4 ft. Peru, 1825. Greenhouse. (B. M. 2697.)
- S. Seafortianum** (Seafort's)\* *fl.*, calyx small, minutely five-toothed; corolla pale red or lilac, deeply five-cleft, scarcely ½ in. long; pedicels diverging; cymes peduncled, lateral, paniculate. *fr.* yellowish-red, globose. *l.* petiolate, ovate, pointed, entire, 1½ in. to 3 in. long; lower ones (or all) pinnately divided, the terminal segment 1½ in. to 3 in. long. West Indies, 1804. Stove trailer. (A. B. R. 504; B. M. 1982; B. R. 969; L. B. C. 971; B. M. 5823, under name of *S. venustum*.)
- S. sisymbriifolium** (Sisymbrium-leaved)\* *fl.* racemose; calyx five-parted; corolla light blue or white, 1 in. or more in diameter, five-lobed. *fr.* red, globose. *l.* deeply pinnatifid; lobes oblong, sinuate, or even again somewhat pinnatifid. *h.* 4 ft. Brazil, North America (escaped from cultivation). Greenhouse annual or perennial, much armed with prickles. (B. M. 2568; B. 49, under name of *S. Balbisii*; B. R. 140, under name of *S. decurrens*.)
- S. s. acutilobum purpureiflorum** (acutely-lobed, purple-flowered). *fl.* purple. *l.* pinnatifid. (B. M. 2228, under name of *S. Balbisii purpurea*.)

**Solanum—continued.**

- S. s. bipinnatifidum** (bipinnatifid). *fl.* white or purple. *l.* bipinnately parted. (B. M. 3954, under name of *S. Balbisii bipinnata*.)
- S. somniculentum** (sleep-giving). *fl.*, calyx nearly hemispherical, small, ten-cleft; corolla dilated with violet, 2 in. broad, five-plicate and angled; peduncles axillary, one-flowered. *l.* solitary or twin, petiolate, ovate, acuminate, oblique and acute at base, 2½ in. long. Stem erect, branched, pilose. *h.* 1½ ft. Mexico. Greenhouse. (F. d. S. v. 454.)
- S. stelligerum** (star-bearing). *fl.* rather small, in lateral racemes; calyx lobes narrow; corolla blue, deeply divided. *fr.* red, globular, small. *l.* petiolate, lanceolate or ovate-lanceolate, acute or acuminate, rarely broad and obtuse, usually 2 in. to 4 in. long. *h.* 6 ft. or less. Australia, 1823. An erect, slightly prickly, greenhouse shrub. (S. E. B. ii. 88.)
- S. texanum** (Texan). *fl.* drooping; calyx stellate-pilose, seven or eight-cleft; corolla whitish-violet, rotate, deeply five-cleft; peduncles solitary, one-flowered. *fr.* scarlet, torulose, depressed, 1½ in. in diameter, resembling tomatoes. *l.* long-petiolate, unequally sub-cordate, sinuate-repand, 5 in. to 8 in. long; lobes short and slightly obtuse, with violet prickles beneath. Stem 1 ft. or more high, simple, almost unarmed, purplish. Texas, &c., 1861. Half-hardy annual. (F. d. S. 1398.) "*S. texanum* is probably not Texan, although raised from seeds said to have been collected there. It is probably *S. integrifolium* of Poiret" (Gray, "Synopsis").
- S. Torreyi** (Torrey's). *fl.* large and handsome; calyx often six lobed; corolla violet, rarely white, 1½ in. in diameter, the lobes broadly ovate; cymes at first terminal, loose, two or three-cleft. *fr.* yellow, globose, 1 in. in diameter. *l.* ovate, with a truncate or sub-cordate base, sinuately five to seven-lobed, 4 in. to 6 in. long; lobes entire or undulated, obtuse, unarmed. Prickles small and subulate, scanty, sometimes nearly wanting. *h.* 1 ft. to 2 ft. Texas and Arkansas, 1878. Half-hardy perennial. (B. M. 6461.)
- S. trilobatum** (three-lobed). *fl.*, calyx small, green; lobes ovate, sub-acute; corolla lin. to 1½ in. in diameter, violet, blue, or white; lobes ovate-oblong, obtuse, the midrib of each white at the base, giving a stellate appearance to the base of the corolla; peduncles solitary or accompanied by a single-flowered pedicel, three to six-flowered. *fr.*, berry scarlet, globose, size of a large pea. *l.* lin. to 3 in. long, oblong, rounded, or ovate, sinuately three to five-lobed, smooth, shining. Stem, petioles, midrib, sometimes the nerves of the leaf beneath, and often the peduncles, armed with stout, recurved prickles. *h.* 2 ft. to 5 ft. East Indies, 1759. A prostrate, rambling, or climbing, nearly glabrous undershrub. (B. M. 6866.)
- S. tuberosum** (tuberous-rooted). Potato. *fl.*, corolla lilac or white, with short, deltoid segments. *fr.* usually globose. *l.* shortly petiolate; leaflets many-jugate, ovate or oblong, acute. Tubers large. *h.* 3 ft. more or less. South America, 1597. (J. H. S. i. 14; T. H. S. v. 11.) For culture, enumeration of varieties, &c., see **Potato**. Several so-called tuberous-rooted species are referred, by Mr. Baker, to *S. tuberosum* as mere varieties.
- S. t. demissum** (humble). *fl.*, calyx five-cleft, the segments triangular, acuminate; corolla violet, circular, ten-toothed. *fr.* spheroid, glabrous. *l.* somewhat interruptedly pinnate; leaflets rounded-obovate. Root tuberous. Mexico, 1846. A prostrate, hardy perennial. (J. H. S. iii. 69, under name of *S. demissum*.)
- S. t. etuberosum** (non-tuberous). *fl.* large, borne in rich clusters; calyx segments not pointed; corolla of a bright purple, with a golden-yellow centre. *l.* nearly glabrous. Tubers wanting. Chili, 1853. (B. R. 1712, under name of *S. etuberosum*.)
- S. t. verrucosum** (warted). *fl.* deeply coloured, large. *fr.* dotted all over with white, raised points. *l.*, leaflets fewer than in the type, ovate, acute, densely hairy beneath; petiole longer. Tubers smaller, of excellent taste, with yellow flesh. Mexico. (R. H. 1853, 6, under name of *S. verrucosum*.)
- S. Tweedianum** (Tweedie's). *fl.* large, nodding, in umbellate racemes; calyx deeply five-cleft; corolla white or pale blue, rotate, semi-five-cleft. *l.* sub-cordate, ovate, acute, angular-toothed at the base, on long petioles. *h.* 1½ ft. Buenos Ayres, 1853. Greenhouse perennial. (B. M. 3585.)
- S. uncinellum** (slightly hooked). *fl.*, calyx campanulate, with four rounded teeth; corolla rose-coloured, at length spreading, five-parted; panicle terminal, simple. *l.* entire, ovate-lanceolate, sub-cordate, obsoletely pubescent. Stem decumbent, filiform, pubescent. Brazil, 1837. Stove perennial. (B. R. 1840, 15.)
- S. venustum** (charming). A synonym of *S. Seafortianum*.
- S. Wallisii** (Wallis'). *fl.* in loose, pedunculate cymes; corolla purple, lin. to 1½ in. in diameter; peduncles blackish-violet, *fr.* violet, marbled and spotted with a paler colour, large, plum-shaped, edible. *l.* simple, lanceolate, acuminate, entire, 5 in. to 4 in. long, 1½ in. to 2 in. broad, dark purplish-green; petioles and nervures (as well as the stem) blackish-violet. *h.* 2 ft. Peru, 1877. A compact and bushy, stove or greenhouse species. (R. H. 1877, p. 291.)
- S. Warszewiczii** (Warszewicz'). *fl.* white, numerous; *l.* large, soft, oval sub-cordiform, deeply nine-lobed; petiole and midrib



**Solanum**—continued.

covered with red, stellate prickles. Native country unknown. Suffrutescent, armed with prickles, half-hardy. A garden species. (R. H. 1865, p. 430.)

**S. Wendlandii** (Wendland's). *f.* lilac-blue, 2½ in. in diameter; cymes 6 in. and more across, terminating pendulous branches. August. *l.* bright green, variable, 2 in. to 10 in. long, 1½ in. to 4 in. broad; uppermost ones simple, oblong, acuminate, with a cordate base, or three-lobed, with the lobes sub-equal or unequal, and sometimes lobed at the sides, or trifoliate with equal or unequal leaflets; lower leaves on the branches 6 in. to 10 in. long, pinnate below and pinnatifid above, with four to six pairs of lobes or leaflets, which are ovate or oblong, entire and acuminate; prickles on the stems, branches, and petioles few, scattered, short, hooked. Costa Rica, 1882. Climbing, glabrous, stove shrub. (B. M. 6914.)

**SOLARIA** (named in honour of Francisci de Borja Solar, an eminent Chilian mathematician). *SYN. Symea.* *ORD. Liliaceæ.* A monotypic genus. The species is a remarkable, greenhouse, bulbous plant. It thrives in a compost of sandy loam and leaf mould. The bulbs must be kept nearly dry during their resting period, the quantity of water being gradually diminished as the leaves begin to die down. Propagation may be effected by seeds, or by offsets.

**S. miersioides** (Miersia-like). *f.* green, small, inconspicuous, pedicellate, erect, many in a terminal umbel; perianth segments connate at base in a shortly campanulate tube, spreading above; stamens three; involucre bracts two, scarious; scape simple, leafless. Spring. *l.* (? always) radical, solitary, broad-linear. *h.* 4 in. Chili, 1871. *SYN. Symea miersioides* (Ref. B. 260).

**SOLAR INFLUENCE.** Inasmuch as all life on the earth depends upon the warmth and light of the sun, it follows that Solar Influence upon plants is of the most far-reaching kind. The conversion of mineral compounds and gases into food suitable for the nourishment of plants, goes on only during light in their green parts, where chlorophyll exists; on this food, formed in their tissues, all green plants subsist, and all parasitic plants and animals are nourished indirectly by it, as they feed on living or dead plants. But, apart from this, the most important of all influences upon plant-life, the sun exerts certain other powers; and it is necessary for gardeners to take advantage of these, or to ward off the evils resulting from their action, according to the requirements of the plants affected.

Leaving untouched the subject of the Sun's Influence in regulating the seasons, the present article will deal only with the effects of exposure to the sun's rays during the season of active vegetation. All are familiar with the fact that the sun gives both heat and light. To a certain extent, the heat-rays may be converted into light, or the light-rays into heat; but this need not be taken account of here. The heat-rays are the chief source of heat with which we are acquainted, and, except in hotheds and hothouses, they are the only source available in horticulture. They originate the vital processes of germination in seeds, and of the bursting of new buds and leaves on the bare branches in spring. But, in dry summers, and especially in confined situations, fully exposed to the sun's rays, the air and the soil become parched with drought, and plants perish for lack of water. This danger must be warded off by watering the plants, or by irrigation, if that is practicable; and subjects that are peculiarly liable to injury from drought should be protected under some kind of shelter, such as an awning. A temperature higher than that to which a plant is accustomed, if continued for some time, is apt to induce in it a weak habit of growth, owing to over-stimulation; new branches and leaves being produced more rapidly than food can be supplied for their full development. Certain injurious effects of exposure to too great heat of the sun will be treated of under **Sun-burning**.

Plants differ a good deal in the amount of light that they require. Most green plants need to be exposed to full sunshine for some part of each day; and if this, or, at least, full daylight, is withheld, they turn pale and

**Solar Influence**—continued.

sickly, and, sooner or later, perish. On the other hand, many Ferns, and a few flowering plants, suffer in health when exposed to bright sunshine: these plants require shady places, *e.g.*, shade of dense forests or caves. In gardens, they require special protection from light, and are usually shaded by green glass, or by green paint on the glass, or, better, by thin green cloth, as this can be removed in dull, cloudy weather.

Like heat, light sometimes proves too great a stimulus, and plants suffer from excess of it. In greenhouses, plants not unfrequently have their leaves marked with dry spots, that look as if scorched through the tissues. For their supposed causes, and for the most successful preventive treatment, see **Sun-burning**.

**SOLDANELLA** (a diminutive of *solidus*, a piece of money; alluding to the shape of the leaves). *ORD. Primulaceæ.* A small genus (three or four species) of very pretty, mostly hardy, glabrous, perennial herbs, inhabiting the Alps of Central Europe. Flowers blue, violet, or rose, rarely white, nodding; calyx five-parted, persistent; corolla hypogynous, infundibular-campanulate, five-lobed to the middle, the lobes imbricated; stamens affixed to the throat of the corolla; scapes slender, solitary or few, one-flowered or umbellately many-flowered. Leaves long-petiolate, thick, cordate-orbicular or reniform, entire. *S. alpina* is one of the most charming alpine plants in our gardens. The species succeed in a peat border, or in pots of peat and loam. Propagation may be effected by seeds, or by division.

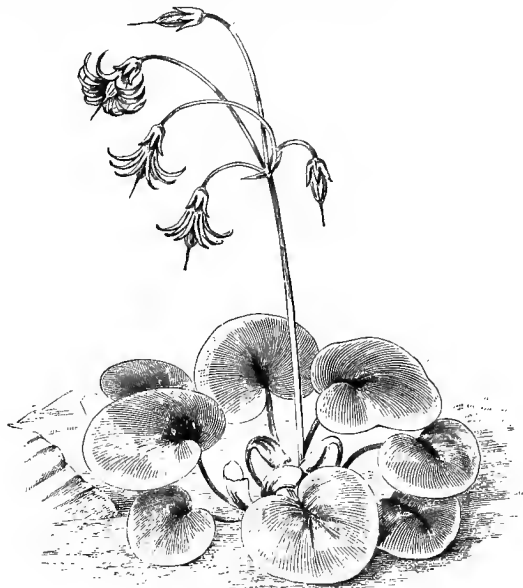


FIG. 499. SOLDANELLA MONTANA.

**S. alpina** (alpine).\* Blue Moonwort. *f.* violet, fimbriated, pendent; style equalling or exceeding the corolla; pedicels pubescent, slightly glandular; scapes two to four-flowered. April. *l.* roundish-reniform, entire or sub-repand, or loosely and remotely ciliated. *h.* 3 in. 1656. (B. M. 49; F. d. S. 894; J. F. A. 118.) A variety, *Wheeleri*, is the most floriferous form of this plant.

**S. Clusii** (Clusius). *f.* blue, campanulate, with a neatly notched margin; style shorter than the corolla; pedicels slightly scabrous, with minute, sessile glands; scape one, rarely two-flowered. April. *l.* cordate-reniform, slightly repand. *h.* 2 in. to 3 in. 1820. (B. M. 2165.) *SYN. S. pusilla* (S. B. F. G. ser. ii. 48).

**S. minima** (smallest). *f.* suffused with lilac, purple-striped within, cut one-third its length, spreading; style shorter than the corolla; pedicels pubescent; scapes one-flowered. April. *l.* orbicular. *h.* 2 in. 1823. (S. B. F. G. ser. ii. 53.)



**Soldanella**—*continued*.

**S. montana** (mountain).\* *fl.* purple; corolla cut to the middle, equalled or exceeded by the style; pedicels shortly glandular-pubescent; scapes two to four-flowered. April. *l.* nearly round, loosely and remotely crenate. *h.* 3in. 1816. See Fig. 499. (S. B. F. G. 11.)

**S. pusilla** (small). A synonym of *S. Clusii*.

**SOLEA**. A synonym of *Ionidium* (which see).

**SOLENA**. A synonym of *Posoqueria* (which see).

**SOLENANDRA** (of Beauvois). A synonym of *Galax* (which see).

**SOLENANTHA**. A synonym of *Hymenanthera* (which see).

**SOLENANTHUS** (from *solen*, a tube, and *anthos*, a flower; alluding to the shape of the corolla). ORD. *Boraginæ*. A genus comprising about ten species of hardy, perennial herbs, inhabiting South Europe, and West and Russian Asia. Flowers blue or pink, racemose; calyx five-parted; corolla tubular or nearly funnel-shaped, with a limb of five small lobes. Leaves alternate. *P. circinnatus* has been introduced, but is probably not now grown.

**SOLENIDIUM** (from *solen*, a tube, and *eidion*, appearance; in allusion to the shape of the flower). ORD. *Orchideæ*. A monotypic genus. The species is a curious, stove, epiphytal orchid, with the habit of *Oncidium*. It differs in the crest of its lip consisting of a pair of long, feathery, raised plates, and in one or two other technical details. For culture, see *Oncidium*.

**S. racemosum** (racemose). *fl.* yellow, spotted with red, mediocre, long-pedicellate, in a loose raceme; sepals and petals free, spreading; lip spreading at the base of the column, contracted in a long claw; scapes axillary under the pseudo-bulbs, simple. November. *l.* rather long, ensiform, thinly coriaceous, narrowed at base. Stem shortened, terminating in a one or two-leaved pseudo-bulb. *h.* 6in. Andes of Columbia. (L. & P. F. G. iii. 102.)

**SOLENOMELUS** (from *solen*, a tube, and *melos*, a limb; in allusion to the tubular perianth). SYN. *Cruikshankii*, *Lechlera*. ORD. *Iridæ*. A small genus (two species) of half-hardy, rhizomatous plants, natives of Chili. Flowers many in a spathe, shortly pedicellate; perianth yellow, with a slender tube and spreading lobes; stamens affixed to the throat; spathe terminal, or a few on long peduncles. Leaves radical or clustered at the base of the stem, linear, and a few at the sides of the stem. Stems sometimes slightly thickened at base. For culture of *S. chilensis*, the only species introduced, see *Sisyrinchium*.

**S. chilensis** (Chilian). *fl.* perianth deep yellow, the segments obovate, spreading, a little concave in their lower half, and there narrow, with a small, dark purple spot at the very base; spathe four or five-flowered; peduncles solitary or two to four. June. *l.* radical ones 6in. to 8in. long; cauline ones remote, gradually shorter upwards, linear-ensiform, sheathing at base. Stems 1ft. to 1½ ft. high, zigzag, leafy. 1868. SYN. *Sisyrinchium longistylum* (F. d. S. 255), *S. pedunculatum* (B. M. 2965).

**SOLENOPHORA** (from *solen*, a tube, and *pherein*, to bear; in allusion to the tubular form of the corolla). Including *Arctocalyx*. ORD. *Gesneraceæ*. A small genus (four species) of stove, evergreen, branched, scabrous-pubescent shrubs, confined to Mexico. Flowers scarlet or yellow, large, solitary or few, on short, axillary peduncles; calyx tube adnate, the limb five-lobed; corolla tube elongated, with a broad throat, the limb shortly and broadly five-lobed, sub-erect. Leaves opposite, on long petioles, ample, membranous, often dissimilar. *S. Endlicheriana*, the only species introduced, is a handsome plant, requiring culture similar to *Gloxinia* (which see).

**S. Endlicheriana** (Endlicher's). *fl.* of a beautiful orange-colour, marked with purple, solitary or in fascicles of two to five; corolla infundibular-campanulate, hairy without, loosely curved, 2½ in. to 3in. long. April. *l.* much spreading, broadly elliptic, acuminate, hairy, the largest 1ft. to 1½ ft. long; petioles 3in. to 4in. long. Stem suffrutescent, erect, purplish, 1ft. to 2ft. high, emitting aerial roots. 1849. (F. d. S. 546 and L. & P. F. G. i. 69, under name of *Arctocalyx Endlicherianus*.)

**SOLENOPSIS**. A synonym of *Laurentia* (which see).

**SOLIDAGO** (from *solido*, to join or make whole; alluding to reputed vulnerary qualities). Golden Rod. SYN. *Doria*. ORD. *Compositæ*. A large genus (about eighty species) of mostly hardy, perennial herbs, rarely shrubby at base; they are nearly all North American, one or two being found in South America, one in temperate Asia and Europe, and one in the Azores. Flower-heads usually yellow, small, in racemes or clusters; involucre oblong or narrowly-campanulate, the bracts appressed, many-seriate; ray florets ligulate, spreading, or rarely small and erect; achenes sub-terete or angled. Leaves alternate, entire or often toothed. Owing to the coarse habit of these plants, and the manner in which they impoverish the soil, they are mostly confined to scrubberies and old-fashioned borders, where their bright yellow flowers contrast well with Michaelmas Daisies. Of the large number of species introduced, those described below are probably the best; all are North American, *S. Virgaurea* being also found in Britain. Any common soil is suitable; and propagation may be readily effected by divisions.

**S. altissima** (very tall). A synonym of *S. rugosa*.

**S. canadensis** (Canadian). *fl.* heads small; ray florets very short; panicle ample, crowded. August. *l.* lanceolate, acuminate, sharply serrated (sometimes almost entire), more or less pubescent beneath and rough above. Stem roughly hairy. *h.* 3ft. to 6ft. 1648.

**S. Drummondii** (Drummond's).\* *fl.* heads small; rays four or five, short; involucre scales oblong, obtuse; racemes short, panicled. Summer. *l.* broadly ovate or oval, somewhat triple-ribbed, coarsely and sharply serrated, some of them almost entire, beneath (as well as the stem) minutely velvety-pubescent. Stem 1ft. to 3ft. high. 1885. (B. M. 6805.)

**S. elliptica axilliflora** (elliptic-leaved, axillary-flowered). *fl.* heads rather large, in short, or somewhat elongated and racemiform, erect or spreading clusters, which are mostly axillary and shorter than the leaves. *l.* oval to broadly lanceolate. *S. fragrans* (of Willdenow) is a narrow-leaved form.

**S. fragrans** (fragrant), of gardens. A synonym of *S. serotina*.

**S. fragrans** (fragrant), of Willdenow. A form of *S. elliptica axilliflora*.

**S. lanceolata** (lanceolate-leaved).\* *fl.* heads obconical, mostly sessile, in dense clusters; ray florets fifteen to twenty. September. *l.* linear-lanceolate, entire, roughish above, pubescent on the veins beneath. Stem pubescent above, corymbose. *h.* 2ft. to 3ft. 1758. (B. M. 2546.) SYN. *Euthamia graminifolia*.

**S. multiradiata** (many-rayed). *fl.* heads large, in a dense, thyrsoid or corymbose raceme; involucre scales narrow, nearly glabrous; ray florets eight to twelve. July. *l.* ciliated, oblong-lanceolate, acute or obtuse, tapering to the base. Stem villous-pubescent, simple, or rarely branched at the summit. 1776.

**S. odora** (odorous). *fl.* heads, ray florets three or four, rather large; racemes spreading, in a small, one-sided panicle. July. *l.* linear-lanceolate, entire, thickish, shining, pellucid-dotted. Stem slender, 2ft. to 3ft. high, often reclined. 1699. The crushed leaves yield a pleasant, aniseate odour.

**S. patula** (spreading). *fl.* heads, involucre scales oblong; ray florets six or seven; peduncles scabrous-pubescent; racemes mostly short and crowded on the elongated, somewhat leafy branches, at length spreading or recurved. August and September. *l.* large, elliptic, acute, serrated, smooth and glabrous beneath. *h.* 2ft. 1805.

**S. rigida** (rigid). *fl.* heads large, in a compound corymb terminating the simple stem, not at all racemose; ray florets seven to ten. September. *l.* oval or oblong, copiously feather-veined, thick and rigid; upper ones closely sessile by a broad base, slightly serrated, the uppermost ones entire. Stem stout, 3ft. to 5ft. high, very leafy. 1710.

**S. rugosa** (wrinkled). *fl.* heads small; involucre scales linear; ray florets six to nine; racemes panicled, spreading. August and September. *l.* ovate-lanceolate, elliptical, or oblong, often thickish and very rugose, coarsely and sharply serrated. Stem 2ft. to 7ft. high, roughly hairy. 1686. SYN. *S. altissima*.

**S. sempervirens** (evergreen). *fl.* heads showy; ray florets golden, eight to ten; racemes short, in an open or contracted panicle. September. *l.* fleshy, very smooth, entire, lanceolate, slightly clasping, or the lower ones lanceolate-oblong, obscurely triple-nerved. Stem smooth and stout, 1ft. to 6ft. high. 1659.

**S. serotina** (late). *fl.* heads, ray florets short; achenes at length nearly glabrous; peduncles roughish-pubescent; panicle pyramidal, of numerous recurved racemes. August to October. *l.* lanceolate, acuminate, serrated, glabrous except on the veins beneath, the margins and usually the upper surface scabrous. Stem often glaucous. *h.* 3ft. 1758. SYN. *S. fragrans* (of gardens).

**Solidago**—continued.

**S. speciosa** (showy).\* *fl.*-heads rather large, somewhat crowded in numerous erect racemes, forming an ample, pyramidal or thyriform panicle; ray florets about five, ample. October. *l.* thickish, rough, with smooth margins, oval or ovate, slightly serrated; lower ones 4 in. to 6 in. long (in the larger forms), contracted into a margined petiole; uppermost ones oblong-lanceolate. Stem stout, smooth, 3 ft. to 6 ft. high. 1817. A handsome species.

**S. Virgaurea**. Common Golden Rod. *fl.*-heads crowded; ray florets ten to twelve, spreading. July to September. *l.* linear- or lanceolate-oblong, 1 in. to 4 in. long, obscurely toothed, obtuse or acute. Stem erect, sparingly branched. *h.* 4 in. to 2 ft. North America, Europe (Britain), &c. (Sy. En. B. 778.) The variety *canadica* (Sy. En. B. 779) is a dwarf form, found on rocky mountain ledges.

**SOLITARY**. Growing singly.

**SOLLYA** (named after Richard Horsman Solly, 1778-1858, a vegetable physiologist and anatomist). ORD. *Pittosporæ*. A small genus (two species) of ornamental, greenhouse, evergreen twiners, confined to Australia. Flowers blue, nodding, on slender pedicels, in terminal, loose, few-flowered cymes, or rarely solitary; sepals small, distinct; petals spreading from the base, obovate; anthers connivent in a cone round the pistil. Leaves narrow. The species thrive in well-drained, peaty soil. Propagated by cuttings, inserted in sand, under a glass.

**S. Drummondii** (Drummond's). A synonym of *S. parviflora*.

**S. heterophylla** (variable-leaved).\* Australian Bluebell Creeper. *fl.*, petals four to five lines long; cymes terminal or leaf-opposed, drooping, usually four to eight-flowered, but sometimes with twelve or more flowers. July. *l.* varying from ovate-lanceolate to ovate-oblong, and 1½ in. to 2 in. or more long, to lanceolate or oblong-linear, and 1 in. to 1½ in. long, obtuse or slightly acuminate, quite entire, usually narrowed into short petioles. *h.* 6 ft. 1830. (B. M. 3523; B. R. 1466.)

**S. h. angustifolia** (narrow-leaved). *l.* narrow-lanceolate. Branches less twining than in the type. (B. R. 1840, 3, under name of *S. linearis*.)

**S. linearis** (linear). A synonym of *S. heterophylla angustifolia*.

**S. parviflora** (small-flowered).\* *fl.* blue, small, solitary or two or three in a cyme, on very fine, filiform pedicels; petals about ½ in. long. July. *fr.* ½ in. to ¾ in. long, tapering to both ends. *l.* lanceolate or oblong-linear, the larger ones often above 1 in. long, but in some specimens all under ½ in., very shortly petiolate, and thinner than in *S. heterophylla*. 1833. SYN. *S. Drummondii* (B. G. 261, f. 1).

**S. salicifolia** (Willow-leaved). Most probably a garden variety of *S. heterophylla*.

**SOLOMON'S SEAL**. See *Polygonatum multiflorum*.

**SOLOMON'S SEAL, FALSE**. See *Smilacina*.

**SOMMERFELDTIA**. A synonym of *Drepanocarpus*.

**SONCHUS** (from *Sogchos*, the ancient Greek name used by Theophrastus). Sow-thistle. Including *Atalanthus*. ORD. *Compositæ*. A genus comprising about twenty-four species of greenhouse or hardy, annual or perennial herbs sometimes shrubby at base. Flower-heads yellow, mediocre or rather large, irregularly corymbose-paniculate or sub-umbellate, rarely solitary; involucre conical after flowering, the bracts in many series, imbricated; receptacle flat, naked; florets all ligulate; pappus bristles copious. Leaves radical or alternate, the cauline ones often auriculate-amplexicaul, entire, toothed, pinnatifid, or dissected. *S. arvensis* (Corn Sow-thistle) *S. oleraceus* (Hare's Lettuce, Milk Thistle), and *S. palustris*, are included in the British Flora. *S. oleraceus* was formerly used as a potherb. Few of the species boast of any horticultural merit. The four shrubby species described below are sometimes grown in conservatories, on account of their elegant foliage. They thrive in common soil, and may be increased by cuttings, inserted in sand, under a glass.

**S. gummifer** (gum-bearing).\* *fl.*-heads few, in an irregular, glabrous corymb; involucre scales blackish, slightly appressed, acuminate. Summer. *l.* glabrous, pale beneath; sub-radical ones pinnatifid, the lobes triangular, slightly toothed, acuminate, the terminal one lanceolate-oblong; cauline leaves auricled, rounded, amplexicaul. *h.* 2 ft. to 3 ft. Canary Islands, 1861. (B. M. 5219.)

**Sonchus**—continued.

**S. Jacquinii** (Jacquin's).\* Lachusa de Pastor; Pastor's Lettuce. *fl.*-heads deep golden-yellow, 2 in. to 3 in. in diameter; involucre bracts appressed, slightly woolly obtuse. March. *l.* crowded, 6 in. to 12 in. long, 2 in. to 3 in. broad, spreading and recurved, cordate and half-amplexicaul, oblanceolate, pinnatifid to or beyond the middle, denticulate and ciliate; lobes triangular, acute. *h.* 1 ft. to 2 ft. Canary Islands, 1882. A stout, erect, slightly-branched herb, with a woody stem below, sparingly clothed here and there with patches of snow-white wool. (B. M. 6142.)

**S. pinnatus** (pinnate). *fl.*-heads in a corymbose, branched panicle; involucre scales appressed, glabrous, acuminate, linear or scarcely lanceolate. Summer. *l.* glabrous, pinnatifid; lobes linear-lanceolate, slightly toothed or entire, the terminal one elongated. *h.* 3 ft. Madeira, 1777.

**S. radicans** (long-rooted). *fl.*-heads in a glabrous, irregular corymb; involucre scales blackish, the outer ones broadly ovate, the inner ones linear-lanceolate. Summer. *l.*, radical ones somewhat lyrate pinnatifid, glaucous beneath, with ovate, obtuse, slightly toothed lobes, the terminal one obtusely triangular; cauline leaves auricled, rounded, amplexicaul. *h.* 1 ft. Canary Islands, 1780. (B. M. 5211.)

**SONERILA** (from *Sooli-Soneri-ila*, the Khassee name for one of the species). ORD. *Melastomaceæ*. A genus comprising about fifty-three species of stove herbs or small shrubs, of variable habit, glabrous, hairy, or slightly paleaceous, caulescent or stemless and scapigerous, natives of mountainous parts of the East Indies. Flowers often rosy, disposed in scorpioid racemes or spikes; calyx glabrous or bristly, with an oblong, turbinate, or campanulate tube, and a three-lobed, short, often dilated limb; petals three, ovate, obovate, or oblong, acute, acuminate, or obtuse; stamens three, equal (very rarely six, the alternate ones smaller). Leaves equal or dimorphous, frequently membranous, entire or serrulated, three to five-nerved. Several ornamental species have been introduced. They require a damp atmosphere, and should be allowed partial shade. A compost of fibrous peat, broken small, with a little chopped sphagnum, some sand, and small pieces of charcoal or crocks, intermixed, is most suitable. Propagation may be effected by seeds, which ripen freely; or by cuttings, inserted singly in small pots, during spring, and placed beneath a bell-glass, in a propagating house. All flower in the summer.

**S. Bensoni** (Benson's).\* *fl.* rose-purple; stamens six; anthers all yellow, not produced at the base; peduncle upwards and raceme hairy. 1873. "This plant seems exactly *S. speciosa*. The change of habitat and forcing in rich soil in an English stove may have developed the three stamens usually suppressed in the genus (?)". (C. B. Clarke.) (B. M. 6049.)

**S. elegans** (elegant), of Hooker. A synonym of *S. speciosa*.

**S. grandiflora** (large-flowered). *fl.* mauve; petals nearly ½ in. long, elliptic; racemes dense-flowered; peduncles short, terminal. *l.* crowded on the branchlets, 1 in. to 2 in. long, oblong or elliptic, narrowed at both ends, acute, glabrous, bristly-serrated. Stems very woody below, branching round. *h.* 1 ft. 1855. (B. M. 5354.)

**S. margaritacea** (pearl-spotted).\* *fl.* rose-coloured, eight to ten in a corymb; peduncles red, terminal, generally surrounded at base by a whorl of sub-sessile leaves. *l.* opposite, oblong, or ovate-lanceolate, acute or acuminate; veins oblique, parallel, very dark glossy-green above, with oval, white, margaritaceous spots, arranged in single lines or series, between them; under surface pale, the veins red-purple. Stems rather weak and sub-procumbent, 8 in. to 10 in. long, rich scarlet. 1854. (B. M. 5104; F. d. S. 1126.) The variety *argentea* has leaves surfaced with silvery-grey; in *marginata*, they are banded with silvery-grey.

**S. m. Hendersoni** (Henderson's).\* *fl.* bright lilac-rose, abundantly produced, with prominent, lemon-yellow, arrow-shaped anthers. *l.* ovate, flat, dark olive-green, studded over the whole surface with very white spots. *h.* 6 in. to 8 in. 1875. A compact and free-flowering plant. (F. M. n. s. 159; I. H. n. s. 230; R. G. 897.)

**S. orhiculata** (round-leaved). A synonym of *S. speciosa*.

**S. speciosa** (showy). *fl.* mauve; petals ½ in. long, round-elliptic, acute; raceme often sub-paniculate, with eight to fourteen flowers, and very hairy. *l.* 2 in. to 3 in. long, ovate-elliptic, acute, glabrous or nearly so, denticulated or slightly serrated; petioles ½ in. to 2 in. long. Stem nearly or quite glabrous below, ending in a long peduncle, villous upwards. *h.* 8 in. to 12 in. 1856. (B. M. 5026; F. d. S. 2442.) SYNS. *S. elegans* (B. M. 4978), *S. orhiculata*.

**S. stricta** (erect). *fl.* rose-purple, small; petals obovate. *l.* ½ in. to 1 in. long, lanceolate or elliptic, narrowed at each end, with scattered, lax hairs. Stem 3 in. to 7 in. high, erect, often branched, more or less puberulo-pubescent, and also with long, lax, spreading hairs. 1848. (B. M. 4394.)

**SONNERATIA** (named in honour of Pierre Sonnerat, 1749-1814, who travelled into New Guinea, the East Indies, and China, and communicated many new plants to the botanists of Europe). *SYN. Aubletia*. *ORD. Lythrariev.* A genus comprising five or six species of highly glabrous, stove shrubs and small trees, inhabiting the tropical sea-shores of the Eastern hemisphere. Flowers ample, ebracteolate, in threes at the tips of the branchlets, or axillary and solitary; calyx thickly coriaceous, with a campanulate tube and a four to eight-lobed limb; petals four to eight, small, or wanting; stamens numerous. Berry sub-globose, ten to fifteen-celled, many-seeded. Leaves opposite, petiolate, coriaceous, oblong, acute or obtuse, entire. The three species known to cultivation require similar treatment to that advised for **Lagerströmia**.

**S. acida** (acid). *fl.* six-cleft; petals red. June. *fr.* having acid pulp. *l.* oval-oblong. Branchlets tetragonal. East Indies, 1822. A small tree. The fruits of this species are eaten as a condiment by the Malays.

**S. alba** (white-flowered). *fl.* white, six to eight-cleft, apetalous. May. *fr.* obconical at base, depressed above. *l.* roundish-oval, 2in. to 4½in. long, rounded or retuse at the apex. Branchlets terete. East Indies, 1824. A small tree.

**S. apetalata** (apetalous). Kambala-tree. *fl.* white, four-cleft, apetalous. June. *l.* ovate-lanceolate. Branchlets terete, pendulous. East Indies, 1826. Tree attaining 40ft., growing in Mangrove swamps flooded by the tide.

**SOOT.** This substance is employed in gardening, either as a fertiliser, or to prevent or cure insect ravages, or with all these objects combined. It is, in by far the greater proportion of cases, obtained from chimneys, from the smoke of coal fires. Taken from this source, it usually consists of about 12 per cent. water, 35 to 50 per cent. ash, and the rest volatile substances, which are destroyed by complete combustion. The last-named substances are largely composed of Ammonia; this gives a pungent smell, which is rendered much stronger when quicklime and water are mixed with the Soot. There are also various oily substances, possessed of peculiar smells, and certain acids, formed and driven off by heat during the combustion of coal, that become mixed with the Soot. The ash of Soot contains Calcium, Iron, Magnesium, Potassium, and Sodium, combined variously with Phosphoric and Sulphuric Acids; there is also present a small quantity of Silica and Silicates.

The fertilising effect of a top-dressing of Soot is very decided, and seems to be due, in a great degree, to the presence of Sulphate and Chloride of Ammonium; but the other substances may also produce some effect. Soot has been found to greatly benefit Potatoes, when put into the drills. As a remedy against those larvæ that lie underground during the day, and crawl up to feed on the plants at night, Soot is especially useful, if laid rather thickly around the stems; it will also stimulate the plants to healthy growth. It is also frequently scattered as a top-dressing, or along the drills, about the time when any crop is liable to visits of the parent insects intent on egg-laying; in such a case, it acts as a preventive of attacks. Soot is also used, instead of hellebore powder, for scattering over plants attacked by larvæ (e.g., Sawfly larvæ on Currant-bushes), or by perfect insects (e.g., Turnip Flea on Turnips), and gives valuable results when rightly employed; but care must be taken to avoid applying it when the flavour of the crop would be injured.

To cleanse walls from Red Spider, water with which Soot has been mixed till all that can be dissolved from it has been so, is made up with clay till the mixture is of the consistence of thick paint; and then about 1lb. of flowers of sulphur and 2oz. of soft soap are added to each gallon of the compound. To protect the fruit-trees on the walls from the attacks of the mites, this mixture should be applied all over the wall once a year, taking care to close all crevices.

**SOPHORA** (altered from *Sophora*, the Arabic name for a papilionaceous-flowered tree). Including *Edwardsia* and *Styphnolobium*. *ORD. Leguminosæ.* A genus comprising about twenty-two species of stove, greenhouse, or hardy, evergreen or deciduous trees, shrubs, or rarely perennial herbs, inhabiting the warmer regions of the globe. Flowers white, yellow, or rarely bluish-violet, disposed in simple, terminal racemes, or in a terminal, leafy panicle; calyx teeth short; standard broadly ovate or orbicular, erect or spreading; stamens free or rarely nearly connate in a ring at the base; bracts small; bracteoles none. Pods moniliform, compressed. Leaves imparipinnate; leaflets indefinite, small, exstipellate. The hardy and half-hardy species thrive in well-drained sandy loam, and are most readily raised from imported seeds. The variegated and weeping forms of *S. japonica* must be grafted on the green-leaved type. *S. tetraptera* and *S. l. microphylla* flower freely in many places when planted against a sunny wall, in sheltered spots in the open air; and in the South-west, they do well as standard trees, without the shelter of a wall. The best-known species are described below.



FIG. 500. WINTER STATE OF SOPHORA JAPONICA PENDULA.

**S. bifolia** (two-leaved). A synonym of *Ammodendron Sieversii*.

**S. chrysophylla** (golden-leaved). *fl.* yellow, axillary, in short, racemose spikes; petals of the keel elliptic, with the dorsal margin straight. May and June. *l.*, leaflets seventeen, obovate; younger ones clothed with yellow pubescence. *h.* 6ft. to 10ft. Sandwich Islands. Greenhouse, deciduous shrub. *SYN. Edwardsia chrysophylla* (B. R. 738).

**S. glauca** (glaucous). *fl.* pale purple, in long, racemose spikes; petals imbricated; standard bifid. May and June. *l.*, leaflets twenty-three, alternate, elliptic, mucronate, velvety on both surfaces, as well as the peduncles and branches. *h.* 4ft. to 6ft. Nepal, 1820. A very showy, half-hardy, deciduous shrub. *SYN. S. velutina* (B. R. 1185).

**S. heptaphylla** (seven-leaved). *fl.* yellow; racemes opposite, about as long as the leaves. October. *l.*, leaflets alternate or nearly opposite, usually three or four on each side, oblong or obovate-oblong, slightly acuminate, rounded or slightly acute at base, hairy-pubescent beneath, 1in. to 3in. long. *h.* 6ft. Neilgherries, &c., 1830. Hardy, deciduous shrub or small tree.

**S. japonica** (Japanese).\* Chinese or Japanese Pagoda-tree. *fl.* whitish or cream-coloured, small; panicles loosely-branched, terminal, large. August and September. *l.* graceful, deep bluish-

**Sophora**—continued.

green, pinnate; leaflets eleven to thirteen, oblong-ovate, acute. Naked young wood dark green. *h.* 30ft. to 40ft. China, 1763. A very handsome, hardy, deciduous tree. China and Japan. (A. B. R. 585.) SYN. *Styphnolobium japonicum*.

**S. j. pendula** (pendulous). An exceedingly beautiful tree of the "weeping" class. See Fig. 500.

**S. j. variegata** (variegated). A form with variegated leaves, but not particularly ornamental.

**S. macrocarpa** (large-fruited). *fl.* yellow; racemes short, axillary. April. Pods silky, wingless. *l.*, leaflets thirteen to nineteen, elliptic-oblong, obtuse, coriaceous, silky beneath. *h.* 8ft. to 10ft. Chili, 1822. An elegant, greenhouse, evergreen shrub. (L. B. C. 1125.) SYN. *Edwardsia chilensis* (B. R. 1798).

**S. secundiflora** (side-flowering).\* *fl.* violet, rather large, secund; racemes terminal, crowded. June. *l.*, leaflets nine to thirteen, elliptic-oblong, obtuse, coriaceous, smoothish. *h.* 6ft. Mexico, 1820. A beautiful, greenhouse, evergreen shrub. (R. H. 1854, 201.)

**S. tetraptera** (four-winged).\* *fl.* yellow, *lin.* to 2in. long; wings linear-oblong; racemes axillary, pendulous, four to eight-flowered. May. *l.* *lin.* to 6in. long; leaflets six to forty pairs, broadly obovate to linear-oblong, 4in. to 3in. long, rounded, retuse, or two-lobed at the tip, silky or densely villous on old plants. *h.* 6ft. to 12ft. New Zealand, 1772. Half-hardy, deciduous tree. (G. C. n. s., ix. 729.)

**S. t. grandiflora** (large-flowered). Kowhai. *fl.* 2in. long, narrower than in the type. *l.*, leaflets ten to thirty pairs, usually narrow. Trunk sometimes 1ft. to 5ft. in diameter. A large and robust variety. (B. M. 167, under name of *S. tetraptera*.)

**S. t. microphylla** (small-leaved). New Zealand Laburnum. *fl.* *lin.* to 1½in. long, broader than in the species. *l.*, leaflets on old plants thirty to forty pairs, oblong-obcordate. Young branches very slender and flexuous, with few obovate, membranous leaflets. SYNS. *Edwardsia Macnabiana* (B. M. 3735), *E. microphylla* (B. M. 1442.)

**S. tomentosa** (tomentose). *fl.* yellow, showy; racemes elongated. August. Pods stipitate, 5in. long. *l.*, leaflets eleven to seventeen, oblong, coriaceous, becoming smooth above. *h.* 4ft. to 6ft. North America, &c., 1739. A half-hardy, deciduous, hoary-tomentose shrub. (B. M. 3390.)

**S. velutina** (velvety). A synonym of *S. glauca*.

**SOPHRONANTHE**. A synonym of **Gratiola** (which see).

**SOPHRONITIS** (from *sophron*, modest; in reference to the pretty little flowers of the original species). ORD. *Orchideæ*. A small genus (four or five species) of dwarf-growing, tufted, cool-house, epiphytal orchids, inhabiting the Organ Mountains of Brazil. Flowers very showy, scarlet or violet, borne in short, few-flowered racemes, or solitary from the top of the pseudo-bulb; sepals free, equal, flat, spreading; petals similar or broader; lip erect, the lateral lobes broad and connivent, wholly concealing the short and rather thick column, the middle lobe sub-recurved, entire; pollen masses eight. Leaves coriaceous or fleshy, complicated, at length unfolding, spreading. Pseudo-bulbs clustered on a rhizome, one or two-leaved. The species are well worthy the attention of cultivators, and have the advantage of occupying but little space. They require to be grown in small pans, or on blocks or rafts. The material they prefer is very fibry peat, to which may be added a little crushed charcoal. Perfect drainage is necessary. All the Sophronites require abundance of moisture throughout the year. Propagation may be effected by divisions, made just as growth commences.

**S. cernua** (drooping). *fl.* rose-red, yellowish in the centre, small, produced in short, effuse, axillary racemes; column white, with dark purple wings. Winter. *l.* solitary, ovate, apiculate, rather above 1in. long. *h.* 3in. 1827. (B. M. 3677; B. R. 1129; L. & P. F. G. iii. p. 11.)

**S. coccinea** (scarlet). A synonym of *S. grandiflora*.

**S. grandiflora** (large-flowered).\* *fl.* brilliant scarlet or cinnabar-red, of stout substance, over 3in. in diameter, solitary; sepals linear-oblong, obtuse; petals three times as wide as the sepals; lip undivided, ovate, cucullate at base. Winter. *l.* solitary, oblong, acute, dark green. Stems short, ovate, terete. A very beautiful species. SYNS. *S. coccinea* (F. d. S. 1716), *Cattleya coccinea*. A remarkable hybrid between this species and *Cattleya intermedia*, raised by Messrs. Veitch, five years ago, produced flowers in 1836, and has been described by Reichenbach, in the "Gardener's Chronicle," n. s., vol. xxvi. p. 263, under name of *Laelia Butemaniana*. This plant has the short peduncle of a

**Sophronitis**—continued.

Sophronitis and a short-stalked, Laelia-like flower of a light purple rose-madder, with the very lightest mauve hue, which appears to get deeper as the flower gets older; the middle lacinia of the trifold lip is of the warmest Dahlia carmine, with a light mauve hue; the side laciniae and disk are white, with a light mauve-purple border. The change in nomenclature brought about by this extraordinary cross is given in Prof. Reichenbach's words: "Hence I must reduce Sophronitids as *Laelia cernua*, *pteroearpa*, *militaris*, *purpurea*, *grandiflora*, for those who accept changes, and leave alone *Sophronitis violacea* with a remodelled character."

**S. g. purpurea** (purple). *fl.* purplish; petals blunt. *l.* cuneate-elliptic, acute. Pseudo-bulbs very short, thick, fusiform. 1873.

**S. g. rosea** (rosy). *fl.* of a clear rosy-lake or carmine-rose. A rare form. (Gn. xxv., p. 474.)

**S. grandiflora** (large-flowered), of Hooker. A synonym of *S. militaris*.



FIG. 501. STEM AND FLOWERS OF SOPHRONITIS MILITARIS.

**S. militaris** (military).\* *fl.* solitary, fully 3in. across; sepals and petals bright cinnabar or deep crimson, the former oblong-lanceolate, the latter roundish-elliptic; lip yellow, streaked with bright red, three-lobed, the side lobes incurved, the front one flat and acuminate. November and December. *l.* solitary, elliptic. Pseudo-bulbs oblong-cylindrical. *h.* 6in. 1837. The finest species in the genus; it should be found in every collection. See Fig. 501. SYN. *S. grandiflora* (B. M. 3709; F. M. 329; L. & P. F. G. iii., p. 11, f. 237; L. S. O. 5; P. M. B. ix. 193).

**S. pterocarpa** (wing-fruited). *fl.* rosy-purple; lip ovate, crested; ovary six-winged, long-beaked; raceme short, corymbose. March. *l.* coriaceous, roundish-oblong. *h.* 3in. 1842. A rare plant in gardens. (L. & P. F. G. iii., p. 11, f. 239.)

**S. violacea** (violet). *fl.* violet, solitary; lip obovate, acute, naked, gibbous at base; column with large, fleshy, obtuse, falcate wings; scape terminal, many-bracted at base. Winter. *l.* solitary, linear, dark green, longer than the scape. Pseudo-bulbs oval, small. *h.* 3in. 1836. (B. M. 6880; L. & P. F. G. iii., p. 11, f. 238.)

**SOPUBIA** (said to be a native name in the East Indies). SYNS. *Gerdaria*, *Raphidophyllum*. ORD. *Scrophulariaceæ*. A genus comprising eight or nine species of stove, erect, usually annual herbs, natives of tropical and Southern Africa, Madagascar, the East Indies, the Malayan Archipelago, and Australia. Flowers bracteate, spicate or racemose; calyx campanulate, five-toothed or five-lobed; corolla with a short tube and five broad, spreading lobes; stamens four, didynamous; pedicels bibracteolate. Leaves opposite, or the upper ones alternate, narrow, often laciniate. *S. delphinifolia* appears

**Sopubia**—continued

to be the only species introduced to our gardens. It is a handsome perennial, thriving in peaty soil; it may be increased by cuttings, inserted under a glass, or by seeds.

**S. delphinifolia** (Delphinium-leaved). *fl.* rose-coloured, subsessile; corolla sub-campanulate, lin. to 1½ in. long, lin. in diameter. July. *l.* lin. long, pinnatisect; segments almost as long, few, filiform, flexuous. Stem erect, four-grooved, 3ft. to 4ft. high, spotted with purple. India, 1800. *SYN. Gerardia delphinifolia.*

**SORANTHE.** A synonym of **Sorocephalus** (which see).

**SORBUS.** Included under **Pyrus** (which see).

**SORDID.** Any dirty or muddy colour.

**SOREDIAE.** Bearing small patches on the surface.

**SOREMA.** A synonym of **Nolana** (which see).

**SOREMA.** A heap of carpels belonging to the same flower.

**SORGHUM** (said to be from *Sorghī*, the Indian name). Millet Grass. *SYN. Blumenbachia* (of Koeler). *ORD. Graminæ.* A genus consisting, according to the authors of the "Genera Plantarum," of only a couple of species of half-hardy or greenhouse, annual or perennial grasses, inhabiting the warmer parts of the globe, and more or less extending into temperate regions, one being nearly cosmopolitan. Spikelets numerous, ternate, the central one sessile, the lateral ones pedicellate; panicle terminal, ample, dense or effuse. Leaves flat, often long and broad. *S. vulgare* (Indian Millet) has been tried in England as a general crop, but the climate has been found too cold and damp for the proper ripening of its seeds; the plant is frequently grown in botanic gardens, but has no interest from a horticultural point of view. It is extensively cultivated as an article of food in warmer countries. *S. halepense* is a handsome, hardy species, thriving in ordinary garden soil. Increased by seeds, or by divisions.

**S. halepense** (Aleppan). *fl.* purplish; panicle 3in. to 12in. or more long, loose and often much branched. *l.* long and flat, often rather broad, the midrib usually white and prominent. Stems erect, 2ft. to 10ft. high, the nodes glabrous. Mediterranean region, &c.

**SORINDEIA** (said to be the native name in Madagascar). *ORD. Anacardiaceæ.* A genus comprising about half-a-dozen species of small, stove, glabrous trees, natives of tropical Africa, Java, and Madagascar. Flowers purple or yellow, small; calyx cup-shaped, five-toothed; petals five, rarely more, valvate; stamens in hermaphrodite flowers, five, in males ten to twenty; panicles terminal, branched, bracteate, sparse-flowered. Drupes compressed, one-seeded. Leaves alternate, imparipinnate; leaflets entire. *S. madagascariensis* is the only species introduced. Its fruits have been described as "of a pleasant, sweet-sour, mango taste, but acrid also. These groups grow in a remarkable and interesting way, not only from the branches, but chiefly from the main trunk of the tree, looking as if they were air-roots with fruit upon them, or like parasites. There may be 200 of the tempting fruits hanging in great bunches, 2ft. in length." For culture, see **Anacardium**.

**S. madagascariensis** (Madagascar). *fl.* purple, small, in axillary racemes. May. *l.* on woody petioles. *h.* 10ft. Madagascar, 1828.

**SOROCEPHALUS** (from *soros*, a heap, and *kephale*, a head; alluding to the clustered heads of flowers). *SYN. Soranthe.* *ORD. Proteaceæ.* A genus embracing about ten species of greenhouse, erect or rarely diffuse, Heath-like, densely leafy shrubs, confined to South Africa. Flowers in small beads, clustered in corymbose or capitate spikes; perianth slender, the limb globose or oblong. Leaves scattered, clustered, or nearly imbricated, lanceolate or narrow, sometimes subulate, entire, or the lower ones dissected. A selection of the best-known species is here given. Some of them should be seen in every collection. For culture, see **Protea**.

**Sorocephalus**—continued.

**S. diversifolius** (variable-leaved). *fl.* purple; heads as large as a small plum, solitary, sessile, ovate, obtuse. June. *l.* spatulate-lanceolate, smooth, glabrous; lowest ones 2in. long, trifid-hippinnatifid, channelled; upper ones ½ in. long, undivided, imbricated, slightly obtuse, sub-concave. Stem slender, nearly simple, pubescent above. *h.* 2ft. to 6ft. 1803.

**S. imbricatus** (imbricated). *fl.* lilac, four to five lines long, the lamina bearded; heads sub-ovate, as large as a plum, often two or three aggregate; peduncle scarcely ½ in. long. June. *l.* imbricated, oblong-lanceolate, acute, inflexed-mucronulate, at length somewhat spreading, four to five lines long, scabrous-dotted on the back. Branches slightly pilose, at length glabrous. *h.* 3ft. 1794. An elegant shrub. *SYN. Protea imbricata* (A. B. R. 517).

**S. lanatus** (woolly). *fl.* purple, plumose-bearded, in heads as large as a hazel-nut; involucre five to seven-leaved, coloured; peduncle short, with or nearly without bracts. August. *l.* imbricated, subulate-linear, four to eight lines long, channelled above, obtusely carinate at back, or rounded, slightly scabrous-dotted, pilose-ciliated. Branches slightly pilose. *h.* 2ft. 1790.

**S. setaceus** (bristly). *fl.* purple, the claw rather loosely tomentose, the lamina bearded; heads varying in size between a cherry and a plum; spike sessile, ovate. July. *l.* bristly, slender, smooth, lin. to 1½ in. long, mucronate, and, as well as the branches, pubescent. Branches straight, slightly tomentose. *h.* 2ft. 1823.

**SOROMANES.** Included under **Acrostichum** (which see).

**SOROSE.** Heaped, or bearing sori.

**SOROSIS.** A fleshy mass formed by the consolidation of numerous flowers, seed-vessels and their receptacles: e.g., Bread-fruit, Mulberry, Pineapple.

**SORREL** (*Rumex*). Two or three species of *Rumex* are cultivated in gardens under the name of Sorrel; the common species (*R. Acetosa*) is a native of Britain. All are hardy perennials. Their leaves are used in salads and culinary preparations, and as a substitute for Spinach. Any kind of Sorrel succeeds best in a rather deep soil and moist situation. Plants may be raised from seeds, sown in drills about 15in. apart, in autumn or spring; or by dividing the rootstocks in March and April. When the



FIG. 502. SORREL.

seedlings are about 3in. high, thin them out to 12in. apart, and keep the ground occasionally hoed between afterwards. A plantation will last three or four years. Some leaves may be gathered for use in about two months from the time of seed-sowing. Besides the common species, *R. Acetosa*—of which there are numerous forms that have received distinctive names, indeed several have been described as species by continental botanists—there is the French Sorrel (*R. scutatus*), which has leaves more acid. This latter is distributed throughout Europe, but is not truly native in Britain; it is, however, naturalised in many places in the British Isles.

**SORREL-TREE.** See **Oxydendron arboreum**.

**SORROWFUL-TREE.** A common name for *Nyctanthes arbor-tristis*.

**SORUS** (from *soros*, a heap). The name given to each of the little dark spots so commonly seen on the back of full-grown Fern-fronds (see Figs. 503 and 504), or crowded on specially modified pinnae (see Fig. 505) or fronds (see Fig. 506). Seen through a lens, these



FIG. 503. PINNA OF *POLYPODIUM BRASILICENSE*, showing circular Sori without Indusia.

spots prove to be made up of a crowd or heap of small boxes or **Sporangia** (which *see*), each filled with **Spores** (which *see*). The sorns may be bare, as in *Polypodium* (see Fig. 503), or it may be covered with a membrane,



FIG. 504. BACK OF FERTILE FROND OF *ASPLENIUM ADIANTUM-NIGRUM*, showing Sori with Indusia, fixed by one edge along the side of the Sori.

called the indusium. This covering in some, *e.g.*, *Asplenium* (see Fig. 504) is fixed by one edge along the side of the Sori; in others *e.g.*, *Aspidium*, it is fixed by the middle, so as to resemble a shield; in others, *e.g.*, *Hymenophyllum* and *Trichomanes*, it forms a cup around the base of the Sori; and there are many other less important variations in form. The Sori are situated on the veins, or at their ends along the edges of the fronds. Differences in the arrangement of the Sori, and in the structure of the indusia, are much employed in distinguishing the numerous genera of Ferns from one another.

**SOUARI NUT-TREE.** A name applied to *Caryocar nuciferum*.

**SOULANGIA.** Included under **Phyllica** (which *see*).

**SOUR GOURD.** A common name for *Adansonia digitata*.

**SOUROUBEA.** A synonym of *Ruyschia* (which *see*).

**SOUR SOP**, or **CUSTARD APPLE.** *See Anona muricata*.

**SOUTH AFRICAN YELLOW WOOD.** *See Podocarpus elongata*.



FIG. 505. PORTION OF FERTILE FROND OF *OSMUNDA REGALIS*, showing Sori on modified Pinnae.

**SOUTHERNWOOD** (*Artemisia Abrotanum*). A very old inhabitant of nearly every garden. The plant is grown for its medicinal properties, which are somewhat similar to those of Wormwood. Any ordinary garden soil is suitable for its culture. Southernwood may be easily propagated from cuttings, which root very readily in early summer; also by seeds. The latter are very minute.

**SOUZA.** A synonym of *Sisyrinchium* (which *see*).

**SOWBREAD.** *See Cyclamen*.

**SOWERBEEA** (named in honour of James Edward Sowerby, 1759-1828, an eminent botanical artist). ORD. *Liliaceae*. A small genus (three species) of greenhouse, tufted perennials with fibrous roots, limited to Australia. Flowers pink, in a terminal, globular umbel; perianth persistent without twisting, of six oblong or ovate segments, all free, or the inner ones shortly connate at base; stamens three; scapes or stems leafless, simple or rarely branched at the base. Leaves at the base of the stem linear loriform. Two of the species are grown in this country. They thrive in a mixture of sandy loam and peat. Young plants are easily obtainable by divisions.

**S. juncea** (Rush-like). fl., perianth segments oval-oblong; umbel many-flowered. May. l. at base of stem somewhat distichous,



**Sowerbæa**—*continued*.

linear-filiform, terete, all short or some nearly as long as the stem, bordered at base and sometimes up to 2 in. with scarious, sheathing margins. Stem simple, slender, 1 ft. to 2 ft. high. 1792. (A. B. R. 81; B. M. 1104; T. L. S. v. 6.)

**S. laxiflora** (loose-flowered). *fl.*, perianth segments about ½ in. long, much narrower than in *S. juncea*; umbels loose. June. *l.* crowded at the base of the stem, but sometimes extending some way up, the sheath less prominent and not at all scarious. Stems 1 ft. to 2 ft. high, sometimes slightly branched at the base. 1839. (B. R. 1841, 10.)

**SOW THISTLE.** See **Sonchus**.



FIG. 506. *OPHIOGLOSSUM VULGATUM*, showing Creeping Rootstock and Barren and Fertile Fronds.

**SPADES.** These are the most essential of tools in use throughout the whole year in every garden, whether large or small. Although often considered as being a subject of comparatively little importance, digging, or the art of using a Spade, is really quite the reverse. A great difference is noticeable in the way workmen use a Spade. The proper method of doing so is only learned by experience; even amongst several workmen in a garden, one or two may generally be selected who are more to be trusted than any of the others for digging amongst plants, or where it is important to secure an even surface. It is of great advantage when a workman can dig in either direction—that is, use the Spade with either the right or the left hand on top of the handle. Garden ground may require digging to leave the surface even, or, in autumn, it may be advantageous to merely turn and throw it up rough, for exposure to the weather.

**Spades**—*continued*.

Digging with a Spade is sometimes a dangerous proceeding near the roots of plants; in this case, it is generally preferable to use a fork instead. Spades should always be cleaned after being used, and placed in the tool-shed: it is impossible to work properly with them if they are allowed to get rusty by being left lying about. There are several sizes of Spades made; some, purposely intended for digging drains, have narrow blades, which are rather long in proportion. A medium size, usually known as No. 3, is that most generally useful for digging garden ground. Larger or smaller sizes are sometimes preferred when the soil to be dug is either very light or very heavy.

**SPADICEOUS.** Bearing, or partaking of the nature of, a Spadix.



FIG. 507. *ARUM DRACUNCULUS*, showing the Spadix (*s*) projecting from the Spathe (*sp*), which is open above, but remains closed below around the Flowers.

**SPADIX** (from the Greek *spadix*, a Palm branch bearing fruit). A form of inflorescence, usually having the rachis rather fleshy, with the flowers imbedded in



FIG. 508. *ANTHURIUM SCHERZERIANUM MAXIMUM*, showing an unbranched Spadix (*s*) lying on an open Spathe (*sp*).

**Spadix**—continued.

pits, less often only sessile on its surface. The inflorescence, before the flowers open, is almost always entirely inclosed in one or more spathe, growing from the peduncle (e.g., *Arum*, see Fig. 507); but in a few Palms (e.g., *Calamus* and its allies) there are numerous spathe or small spathe, inclosing only groups of flowers. Rarely (e.g. *Acorus*), the Spadix is not inclosed in either spathe or spathe. The Spadix is usually unbranched (*Anthurium*, see Fig. 508, *Calla*, and some Palms), but in the Palms it is frequently branched (see *Palmæ*). In the family *Aroidæ* (*Araceæ*), and in most genera of Palms, the flowers on the Spadices are individually male or female, but both sexes may occur on the same Spadix, or may be restricted to separate Spadices, or even to separate plants. In certain Palms, hermaphrodite flowers are produced, sometimes along with male or female flowers. Briefly, a Spadix may be defined as a more or less fleshy spike, usually inclosed, before flowering, in one or more spathe, and bearing unisexual flowers; but no exact definition of the term can be consistently adhered to.

**SPADOSTYLES.** Included under *Pultenæa* (which see).

**SPAN.** In length, about 9in. The term refers to the space between the tips of the thumb and little finger when spread out.

**SPANISH BLUEBELL or SQUILL.** See *Scilla hispanica*.

**SPANISH BROOM.** See *Spartium junceum*.

**SPANISH CHESTNUT.** See *Castanea sativa*.

**SPANISH JUICE PLANT.** A common name for *Glycyrrhiza glabra*.

**SPANISH OYSTER PLANT.** See *Scolymus hispanicus*.

**SPARAXIS** (from *sparasso*, to tear; alluding to the lacerated spathe). **ORD.** *Iridæ*. A genus comprising (according to the authors of the "Genera Plantarum") five species of pretty, greenhouse, bulbous plants, natives of South Africa. Flowers one to a spathe, sessile, rather large; perianth yellow, with a short tube and six erect-patent lobes; stamens affixed near the base of the throat; bracts much narrower than the spathe, bidentate; spathe few, scattered, sometimes solitary, broad, scarious, striated or often marked with brown lines, fimbriate-toothed at apex. Leaves few, flat, ensiform or broadly linear, erect or falcate. Stem simple or slightly branched. The best species and varieties are described below. They require precisely similar treatment to that recommended for *Ixia* (to which this genus is allied).

**S. bulbifera** (bulb-bearing). *fl.* three to five, alternate; perianth yellow, funnel-shaped, the segments ovate-oblong, lin. long; spathe valves purple-striped at apex; scape simple or branched, leafy, 1ft. to 2ft. high. May. *l.* lanceolate-ensiform, distichous, acute, five lines broad. 1758. **SYN.** *Ixia bulbifera* (A. B. R. 48; B. M. 545).

**S. grandiflora** (large-flowered).\* *fl.* three to five, alternate; perianth purple, white, or variegated, 2in. long, the segments equal, stellately spreading, oblong-cuneate, rounded at apex; scape simple or dichotomous, terete, leafy, 1ft. to 2ft. high. April. *l.* distichous, lanceolate-ensiform, acute, five lines broad. 1758. (B. M. 779.) **SYNS.** *Ixia aristata* (A. B. R. 87), *I. grandiflora* (B. M. 541).

**S. g. Liliago** (Liliago). *fl.*, perianth white, 2in. deep; spathe whitish, sub-diaphanous, equalling the tube. *l.* finely striated, shorter than the stem. (B. R. 256.)

**S. g. lineata** (red-lined). *fl.*, perianth throat yellow; segments longitudinally marked with a red line, more or less tinged with pink, yellow at base, having a brown mark near the middle, the upper part white; scapes two to four-flowered. *l.* 5in. to 8in. long. (S. B. F. G. ser. ii. 131, under name of *S. lineata*.)

**S. g. stellaris** (star-like). *fl.*, perianth rich purple, rather paler externally; tube short, filiform, exserted; mouth within of a deeper purple, and surrounded by a broad, irregular, starry, white band. *l.* erect, acute. (S. B. F. G. ser. ii. 383, under name of *S. stellaris*.)

**S. pendula** (pendulous).\* *fl.* lilac, veiny, secund, sessile, within somewhat lacerated spathe; perianth segments oblong, obtuse,

**Sparaxis**—continued.

spreading; spikes on capillary peduncles, one-sided, six or seven-flowered, pendulous, with two capillary leaves at the base of each peduncle; scapes erect 4ft. high, pendulous at the end, branched. June. *l.* linear, acute, straight, shorter than the scapes. 1825. (B. R. 1350.) This species is now regarded by Mr. Baker as belonging to *Dierama*, and its proper name is *D. pendula*.

**S. pulcherrima** (very pretty). *fl.* pendulous; perianth dark sanguineous-purple, equal, 1½in. long, campanulate; bracts at the base of the branches 1½in. long; scape attaining 6ft. in its native habitat, the branches remote, capillary, 3in. to 6in. long. October. *l.* narrow-ensiform, rather thick, about ½in. broad, gradually narrowed from below the middle to a very slender apex. 1865. (B. M. 5555; F. d. S. 1810.) *Dierama pulcherrima* is now the correct name of this species.

**S. tricolor** (three-coloured).\* *fl.* three to six, alternate, distant, distichous-spicate; perianth orange, yellow in the throat, the segments oblong, lin. long, with a triangular, black spot in the middle; spathe valves equal, fuscous-spotted, lacerate-cuspidate; scape 1ft. to 2ft. high, erect, simple, leafy. May. *l.* lanceolate-ensiform, erect, distichous, acute, striated, four lines broad. 1789. (B. M. 1482.) **SYN.** *Ixia tricolor* (B. M. 381).

**S. t. blanda** (charming). *fl.*, perianth segments of a whitish ground-colour, flushed with rose, the throat being yellowish. **SYN.** *S. t. subroseo-albida* (B. M. 1482).

**S. t. Griffinali** (Griffin's). *fl.*, throat yellow, with a dark blotch between the throat and the violet-purple upper portion of the segments. **SYN.** *S. t. violaceo-purpurea* (B. M. 1482).

**S. t. versicolor** (various-coloured). *fl.*, perianth segments bright purple with lighter margins, more or less clouded or diluted, having near the base a dark mark, below which they are bright yellow; spathe striped with brown and purple. (S. B. F. G. 160, under name of *S. versicolor*.)

**VARIETIES.** The following list comprises the most desirable garden varieties:

ANGELIQUE, white, yellow centre; DELICATA, light yellow, centre spotted brown; GARIBALDI, rich crimson, yellow centre; JOSEPHINE, white, with yellow centre; LADY CAREY, French white, blotched purple; LEOPARD, primrose, yellow centre; MACULATA, white, purple, and primrose; NAIN, white and crimson, primrose centre; TRICOLOR ALBA, white, black, and yellow; TRICOLOR GRANDIFLORA, rich crimson; VICTOR EMMAUEL, red and yellow.

**SPARGANUM** (an old Greek name used by Dioscorides, probably for *Butomus*, and derived from *sparganon*, a band; alluding to the form of the leaves). **Bur Reed.** **ORD.** *Typhaceæ*. A small genus (less than a dozen species) of marsh or aquatic herbs, inhabiting North temperate regions and Australia. Five species are natives of Britain, but none are of any horticultural value. The stems of *S. ramosum* (Bede Sedge) have been used for making pepper.



FIG. 509. FLOWERING BRANCH OF SPARMANNIA AFRICANA.

**SPARMANNIA** (named in honour of Dr. Andrew Sparrmann, 1748-1820, a Swede, who travelled in South Africa, and afterwards accompanied Captain Cook in his second voyage). ORD. *Tiliaceæ*. A small genus (three species) of softly stellate-pubescent, greenhouse shrubs or trees, natives of tropical or South extra-tropical Africa. Flowers white, with numerous discoloured stamens; sepals and petals four; cymelets terminal, umbelliform; bracts short, involucre. Leaves cordate, toothed or lobed. *S. africana*, the only species known in cultivation, is a beautiful, quick-growing, arborescent shrub, thriving in a compost of loam and peat. It may be freely increased by cuttings, inserted in sandy peat, under a glass, in heat.

*S. africana* (African).\* African Hemp. *fl.* conspicuous, on elongated, many-flowered peduncles; sepals lanceolate; petals obovate; barren filaments yellow, with purple tips. May. *l.* long-petioled, cordate, acuminate, 6 in. to 6 in. long, 3 in. to 4 in. broad, softly hairy on both sides, unequally toothed. Branches terete, patently hairy. *h.* 10 ft. to 20 ft. South Africa, 1790. See Fig. 509. (B. M. 516.) *S. a. flore-pleno* is a handsome, double-flowered variety.

**SPARROW-GRASS.** A corruption of *Asparagus*.

**SPARROWS.** Among gardeners and farmers, Sparrows have long been a bone of contention; but while, a few years ago, the general tendency was to regard them as more useful than harmful, this has, of late years, been changed; and now Sparrows find few to defend them against their many accusers. All are agreed that, at certain seasons, these birds are wholly mischievous. By eating Peas and other seeds in spring, they often ruin the garden produce, or necessitate a second sowing. At a later period, they feed upon the young Peas and other plants, or pick off the buds from Gooseberry-bushes, and other fruit-bearing plants. When seeds are formed, the birds still eat Peas, but chiefly live on the various Cereals (Oats, Wheat, Barley, &c.). It is, however, asserted by the defenders of Sparrows that, in return for these injuries, they do much good by devouring injurious insects and their eggs and larvæ, particularly while there are young birds to be fed in the nests; but examination of the contents of Sparrows' stomachs shows that at no season do insects form more than a very small portion of their food; and that, practically, they do hardly anything to diminish the number of hurtful insects. By far the greater part of their food has been proved to be seeds of Cereals. But not only are Sparrows of little use in destroying hurtful insects; they actually favour the multiplication of the latter in many places, since, by their quarrelsome disposition, they drive away the truly insectivorous birds, whose slender bills and weaker forms do not fit them to fight with Sparrows for their nests. The insectivorous birds must feed on insects or starve; hence they are very useful, and they cannot injure the produce of a garden. Therefore, to have them driven away is a serious evil. Swallows and window martins are peculiarly liable to be ousted by Sparrows. Where the last-named have been kept down, it has been observed that the swallows and martins soon become more numerous, and insects cease to be troublesome. The results of inquiries in America and in Australia quite agree with the above statements; and a war of extermination has been strongly urged, though, of late, the hostility to them has been lessened in New York as they have developed a taste for *Cicada septem-decim*. In England, strenuous efforts are now made in many districts to limit the number of Sparrows, by shooting the birds, and by removing the nests and eggs wherever accessible. These measures can be persevered in by owners and occupiers of land, and by those whom they authorise, even during the "close time," i.e., from 1st March to 1st August, without infringing the Wild Birds Protection Acts, 1880, 1881.

For fuller information, the reader is referred to a work entitled "The House Sparrow and the English Sparrow in America," by Messrs. Gurney, Russell, and others, 1885.

**SPARTIANTHUS.** A synonym of *Spartium* (which see).

**SPARTINA** (from *spartine*, a cord; alluding to the use of the foliage). SYNS. *Limnetis*, *Ponceletia*, *Solenachne*, *Trachynotia*. ORD. *Gramineæ*. A genus comprising six or seven species of stove, greenhouse, or hardy, maritime grasses; two are broadly dispersed over the shores of Europe, America, and Africa, two or three are North American, one is a native of extra-tropical South America, and one is found in Tristan d'Acunha and Amsterdam Island. Spikelets one-flowered; spikes at the sides of a terminal, erect peduncle, sometimes clustered in a long and dense, spike-like panicle, sometimes narrow and scattered. Leaves convolute-terete or esplanate at base. The genus, which is represented in Britain by *S. alternifolia*, *S. stricta* (Cord Grass; Mat Weed, &c.), and *S. Townsendi*, has no horticultural merit.

**SPARTIUM** (the old Greek name used by Dioscorides, and derived from *sparton*, cordage; the twigs of the plant, by maceration, produce a good fibre, which is sometimes made into thread). SYN. *Spartianthus*. ORD. *Leguminosæ*. A monotypic genus. The species is a hardy, deciduous shrub, with Rush-like and often leafless branches. It is a very ornamental plant when in blossom, and consequently is well adapted for shrubberies. Any ordinary soil is suitable. Propagation is usually effected by seeds, which ripen in abundance. Young cuttings will root, if covered with a hand glass.

*S. junceum* (Rush-like).\* Rush or Spanish Broom. *fl.* yellow, fragrant, showy, disposed in terminal racemes; calyx somewhat spathaceous; standard ample; wings obovate; keel incurved, acuminate; bracts and bracteoles minute, highly caducous. July to September. *l.* rare, one-foliolate; stipules wanting. *h.* 6 ft. to 10 ft. Mediterranean region and Canary Isles, 1548. (B. M. 85; S. F. G. 671; B. R. 1974, under name of *S. acutifolium*.) There is a double form in cultivation.

**SPARTOTHAMNUS** (from *sparton*, cordage, and *thamnos*, a branch; alluding to the use of the plant). ORD. *Verbenaceæ*. A monotypic genus. The species is a pretty, glabrous or pubescent, evergreen shrub or subshrub. It requires the temperature of a cool, airy greenhouse. A compost of sandy peat and loam is most suitable for its culture. Propagated by cuttings, inserted in sand, under a glass.

*S. junceus* (Rush-like). *fl.* white, very small, solitary in the axils, with small bracteoles; calyx and corolla five-lobed. August. *l.* small and distant, often reduced to small scales, all opposite; when fully developed ½ in. to ¾ in. long, lanceolate or ovate-lanceolate. Branches divaricate, acutely four-angled, broom-like and appearing almost leafless. *h.* 2 ft. Australia, 1819.

**SPATALANTHUS.** Included under *Romulea* (which see).

**SPATALLA** (from *spatalos*, delicate; in allusion to the nature of the flowers). ORD. *Proteaceæ*. Of this genus seventeen species have been described; they are greenhouse, Heath-like shrubs, restricted to South Africa. Flowers rather small, solitary under the bracts, capitate, sessile or shortly pedicellate, forming a loose spike or terminal raceme; perianth slender, scarcely dilated towards the base, the limb straight or incurved, ovoid or oblong; hypogynous scales four, subulate. Nuts often pubescent or villous. Leaves scattered, filiform or subulate, undivided. A selection of the species known to cultivation is here given. They all have purple flowers and require similar treatment to *Protea* (which see).

*S. incurva* (incurved). *fl.*, involucre three or four-flowered, pubescent, four-leaved; racemes solitary or often aggregate, pedunculate, ½ in. to 2 in. long. May. *l.* rather loosely spreading, ½ in. to 1 in. long, incurved, slender, bristly-mucronate, scarcely attenuated at base, glabrous; young ones, and branchlets, slightly pilose. *h.* 2 ft. 1789.

*S. mollis* (soft). *fl.*, involucre villous, two-leaved; spike solitary, sessile, erect, dense, oblong-cylindrical, branched, scarcely 1 in. long. June. *l.* erect-patent, seven to eight lines long, straight, and, as well as the slender branchlets, silky-villous. *h.* 2 ft. 1826.

*S. nivea* (snowy). *fl.*, involucre campanulate, one-third the length of the perianth; spike sub-sessile, erect, dense, imbricated, 1 in.

**Spatalla**—continued.

to 1½ in. long. June. *l.* imbricated, eight to ten lines long, slender, acute, straight or slightly curved; younger ones (and branches) slightly silky-pilose. *h.* 2ft. 1806.

**S. pedunculata** (long-peduncled). *fl.*, claw tomentose; involucre sub-campanulate, bilabiate, cano-tomentose, at length glabrescent; spike solitary, lin. to 2 in. long, at length rather loose; peduncle lin. to 1½ in. long, with a few adpressed, carinate-subulate bracts. April. *l.* much incurved, nearly lin. long, triquetrous-elliform, rather obtuse, much attenuated at base, incurved-falcate above; young ones straight, slightly silky-pilose. *h.* 2ft. 1822.

**S. prolifera** (proliferous). *fl.*, involucre sub-sessile, four-leaved; spikes sessile, conico-capitate, leafy-bracted. July. *l.* erect, or at length spreading, clustered, imbricated, five to eight lines long, slender, straight or scarcely incurved, setaceous-mucronulate; younger ones (and branchlets) silky. Branches reddish, nearly glabrous. *h.* 2ft. 1800.

**S. pyramidalis** (pyramidal). *fl.* yellowish-pubescent; involucre shortly pedicellate, pubescent, four-leaved; spike lin. to 1½ in. long, solitary, sessile, erect, oblong-pyramidal, dense, sometimes branched at the base. June. *l.* much crowded, erecto-patent, six to ten lines long, slender, very acute, straight, at length slightly recurved, slightly pilose. Branchlets umbellate. *h.* 3ft. 1821.

**SPATHACEOUS.** Bearing, or having the nature of, a spathe.

**SPATHANTHEUM** (from *spathe*, a spathe, and *anthos*, a flower; the flowers are seated on the midrib of the spathe). Including *Gamochlamys*. ORD. *Aroideæ* (*Aracæ*). A small genus (two species) of stove, tuberous-rooted perennials; one is found in Bolivia, and the other is a native of Africa. Flowers spread over the whole length of an inappendiculate, semi-cylindrical spadix, adnate to, and shorter than, the spathe, monocious, all perfect; spathe oblong-lanceolate, acuminate, membranous, at length opening, longitudinally nerved and reticulated, persistent; peduncle slender, nearly equalling the leaves. Leaves on long and slender petioles, cordate or sagittate-ovate, entire or pinnatifid-lobed. *S. heterandrum* (the only species in cultivation) thrives in a well-drained soil, composed of rich loam and peat. Plenty of water is necessary during the growing season. Propagation may be effected by offsets, or by division of the tubers.

**S. heterandrum** (various-anthered). *fl.*, spathe green, fleshy, boat-shaped, acute, 4 in. to 5 in. long; spadix half as long as the spathe, adnate through its whole length; peduncle rather shorter than the petiole, firm, erect, sub-terete. *l.* cordate-ovate, bright green, glabrous, rather fleshy, 1½ in. long, deeply pinnatifid, the divisions acute; petioles 2ft. long. Rootstock bearing a solitary leaf. Africa, 1876. SYN. *Gamochlamys heterandra*.

**SPATHE** (from *spathe*, a broad blade; in allusion to its form in most Palm-trees). A large bract, situated on the flower-stalk below the inflorescence, and surrounding the latter until the flowers are ready to open. There may be only one bract for each inflorescence (e.g., *Narcissus*, *Arum*, &c.); but often (in many Palms) there are two or more, the outer ones being smaller and open at the top, and hence called incomplete. Spathes vary in texture, from membranous (*Narcissus*) to leafy (*Arum*, see Fig. 507, page 463), or fleshy, or woody, as in many of the larger Palms (*Cocos*, *Maximiliana*, &c.), in which the part that incloses the flowers may reach a length of over 3ft., and a thickness of over ½ in.

**SPATHEGASTER.** A group of Gall-flies, that form galls on Oak. Most conspicuous of these is the Currant Gall, so common in the early summer on the male catkins, and on leaves, of the common Oak, throughout Britain. The experiments of Dr. Adler, and of other entomologists, have, of late years, given grounds for the belief that the insects originally grouped in the genus *Spathegaster*, are only stages in the development of what were formerly regarded as distinct species of a different genus, *Neuroterus*, which make galls in autumn, very different from those of *Spathegaster* in appearance. For an account of what are now believed to be the relations between the insects and galls, see **Oak Galls**.

**SPATHELLA** (from *spathe*, a Palm-tree; alluding to the similarity of habit). ORD. *Simarubæ*. A genus comprising only three species of tall and showy, stove, evergreen trees, with simple trunks, inhabiting the West Indies. Flowers rather large, shortly pedicellate, disposed in ample, terminal, elongated, branched panicles, the ultimate branchlets of which are sub-cymose; calyx five-parted; petals five, scarcely longer than the calyx, imbricated; stamens five. Leaves alternate, imparipinnate, many-jugate; leaflets alternate, linear-oblong or sickle-shaped, sub-entire or serrated, the margins gland-bearing. *S. simplex*, the only species introduced to cultivation, thrives in a compost of leam and peat; it may be increased by ripened cuttings, inserted in sand, under a glass, in heat.

**S. simplex** (simple). May Pole, Mountain Green, or Mountain Pride of the West Indies. *fl.* red; panicle powdery, spreading, several feet long. April. *l.* twenty to forty-jugate, puberulous and glabrate beneath, oblong-lanceolate or linear-lanceolate, acuminate, or falcate, crenate or quite entire; leaflets very variable, opposite or alternate, sessile or petiolulate, crenated or entire. Stem slender, resembling that of a palm, 20ft. to 50ft. high. 1778. (B. R. 670.)

**SPATHELLA** (a diminutive of *spathe*). The name given to the numerous small bracts that, on the spadices of *Calamus*, and allied genera of Palms, replace the one or few large spathes met with among the other Palms.

**SPATHICARPA** (from *spathe*, a spathe, and *karpas*, fruit; the ovaries are seated along the midrib of the spathe). ORD. *Aroideæ* (*Aracæ*). This genus embraces eight species of stove, evergreen, tuberous-rooted herbs, natives of Brazil and Paraguay. Flowers all perfect, the males and females longitudinally disposed in a few series, along the semi-cylindrical, inappendiculate spadix; spathe oblong-lanceolate, acuminate, membranous, at length opening, convolute at base and apex, persistent; peduncles slender, exceeding the leaves. Leaves membranous, lanceolate, or hastate- or sagittate-cordate, or hastately trisected; petioles elongated, long-sheathing. Only a couple of the species have been introduced. These thrive in rich, sandy loam; they may be multiplied by divisions, or by seeds.

**S. hastifolia** (hastate-leaved). *fl.*, spathe greenish, elegantly acuminate; spadix elongated. *l.* tripartite; middle part oblong-ovate, acuminate; lateral ones oblong or ovate-lanceolate, slightly acute; petioles twice or thrice as long as the blades. *h.* 1ft. Minas Geraes.

**S. longicuspis** (long-cuspidate). A synonym of *S. sagittifolia*.

**S. sagittifolia** (sagittate-leaved). *fl.*, spathe green, long-decurrent at base, long or rarely short-cuspidate; spadix slender, scarcely shorter than the spathe. *l.* sagittate; anterior lobe ovate-lanceolate, slightly elongated; posterior lobe retrorse, spreading, obtuse; petioles nearly twice as long as the blades. *h.* 6 in. to 12 in. Bahia, 1860. SYN. *S. longicuspis*.

**S. s. platyspatha** (broad-spathed). *fl.*, spathe dilated towards the apex, shortly cuspidate. *l.* sagittate, deeply cordate at base.

**SPATHIPHYLLUM** (from *spathe*, a spathe, and *phyllon*, a leaf; alluding to the leaf-like spathe). Including *Anomophyllum* and *Massovia*. ORD. *Aroideæ* (*Aracæ*). A genus embracing about twenty tropical American, and two Malayan, species of almost stemless, stove, evergreen, perennial herbs. Flowers all fertile, dense; spathe leaf-like, membranous, oblong or lanceolate, acute, acuminate, or caudate-acuminate, at length broadly expanded, accrescent and persistent; spadix shorter than the spathe, sessile or stipitate, the stalk sometimes adnate to the spathe, cylindrical. Leaves oblong or lanceolate, acuminate or cuspidate; petioles elongated, long-sheathing, usually geniculate at apex. Several of the species have been introduced, and are here described. Equal parts of leaf mould and peat, mixed with a little loam and small pieces of charcoal, form a suitable compost for *Spathiphyllums*. They require a moist atmosphere and an abundance of water. Propagation is sometimes effected by seeds, sown on a hothed, but chiefly by divisions of the rootstock. "For decorative purposes, some of the smaller species, such as *S. candidum*,

**Spathiphyllum**—continued.

*S. cannaefolium*, *S. floribundum*, and *S. Patini*, are very useful, and form a very effective contrast with *Anthurium Andreanum* and *A. Scherzerianum*" (N. E. Brown).

**S. candidum** (white). \* *fl.*, spathe pure white, ovate, acuminate, about 3½ in. in length; spadix white, slender, straight, cylindrical; flowering peduncle often knee-jointed just below the spathe. *l.* ovate-lanceolate, attenuately acuminate, 6 in. to 8 in. long, on slender, erect petioles. *h.* 9 in. Columbia, 1875. Closely allied to *S. Patini*. SYN. *Anthurium candidum*.

**S. cannaefolium** (Canna-leaved). \* *fl.*, spathe white, lanceolate or elliptic-oblong, sub-sessile, scarcely decurrent, shortly cuspidate, 6 in. long, 2 in. broad; spadix white, 5 in. long, 3 in. broad. *l.* ovate or elliptic-oblong, shortly acuminate; petioles equalling or exceeding the blades, sheathed scarcely to the middle. *h.* 1 ft. Venezuela, Guiana, and Brazil. (R. G. 640.) SYNS. *S. cannaeforme*, *Anthurium Dechardi* (I. H. 269), *Pothos cannaefolia* (B. M. 605; L. B. C. 471).

**S. cannaeforme** (Canna-like). A synonym of *S. cannaefolium*.

**S. cochlearispathum** (spoon-spathed). \* *fl.*, spathe green, 1 ft. long, ovate or oblong-ovate, produced into a long-cuspidate point; spadix whitish. *l.* broadly oblong, undulated, upwards of 3 ft. long and 1 ft. wide, rounded or sub-cordate at base, lustrous-green; petioles nearly equalling the blades. *h.* 4 ft. Mexico, 1875. SYN. *S. heliconiæfolium* (I. H. 189).

**S. commutatum** (changed). \* *fl.*, spathe white, oblong-lanceolate, nearly flat, cuspidate; spadix white, short, oblong; peduncles tall, shortly decurrent. *l.* ovate-oblong, deep green; petioles shorter than the blades. *h.* 2½ ft. Philippines, 1870. A rather elegant plant, rivaling in beauty the well-known African or Trumpet Lily. (R. G. 637, f. 1-3, under name of *S. Minahasæ*.)

**S. floribundum** (bundle-flowered). \* *fl.*, spathe ivory-white, 2 in. long, oblong-lanceolate, with an elongate-cuspidate acumen; spadix white, stipitate, scarcely shorter than the spathe; peduncles much exceeding the petioles. *l.* oblong-elliptic or oblong-lanceolate, acuminate and very acute, inequilateral, paler beneath; peduncles nearly equalling the blades. *h.* 1 ft. New Grenada, 1874. (I. H. 159, under name of *Anthurium floribundum*.)

**S. heliconiæfolium** (Heliconia-leaved). A synonym of *S. cochlearispathum*.

**S. hybridum** (hybrid). A garden hybrid between *S. cannaefolium* and *S. Patini*, and quite intermediate in character. The spathe is as large as in the first-named parent, and whiter on both sides. (B. H. 1885, p. 89; G. C. xix. p. 500; I. H. 450.)

**S. Ortgiesii** (Ortgies'). \* *fl.*, spathe bright green, oblong-elliptic; spadix white, oblong, the stalk connate with the base of the midrib. *l.* broadly elliptic or elliptic-oblong, undulated; petioles broadly winged. *h.* 1½ ft. Mexico, 1873. (R. G. 738.)

**S. Patini** (Patini's). \* *fl.*, spathe whitish, except the green midrib, oblong-lanceolate, very long-acuminate, spreading or reflexed; spadix whitish, straight, obtuse, rather long-stipitate, a little shorter than the spathe; peduncles equalling or exceeding the leaves. *l.* elongate-lanceolate, long-narrowed to both ends, very acute, deflexed, inequilateral, pale green; petioles twice as long as the blades, erect, slender, terete. *h.* 9 in. New Grenada, 1874. (I. H. 397.) SYNS. *Amomophyllum Patini*, *Anthurium Patini* (G. C. n. s., iii. p. 525).

**S. pictum** (painted). \* *l.* somewhat fleshy, broadly ovate-elliptic, 1½ ft. or more long, glossy dark green, mottled along the course of the transverse veins, with blotches of golden-green. South America, 1874. An ornamental plant, in habit resembling a Dieffenbachia. The proper name of this plant is *Rhodospatha picta*.

**S. Wallisii** (Wallis'). \* *fl.* spathe of a pleasing green, 5½ in. long, oblong-elliptic, rounded and decurrent at base, long-cuspidate at apex; spadix cylindrical, one-third the length of the spathe. *l.* 6 in. to 9 in. long, oblong-lanceolate, rounded or cuneate at base, cuspidate at apex, the margins slightly crenate-crested; petioles 5 in. to 8 in. long. New Grenada. (R. G. 920.)

**SPATHIUM** (of Edgeworth). A synonym of *Aponogeton*.

**SPATHIUM** (of Loureiro). A synonym of *Saururus* (which see).

**SPATHODEA** (from *spathe*, a spathe; referring to the form of the calyx). ORD. *Bignoniaceæ*. A monotypic (?) genus. *S. campanulata* is a noble, stove, ever-green tree, requiring culture similar to *Bignonia* (which see). See also *Newbouldia*.

**S. campanulata** (bell-shaped). \* *fl.* orange, in a short, terminal, slightly-branched raceme; calyx long, spathe-like, densely tomentose; corolla campanulate, 3 in. long, 2½ in. in diameter, with a sub-bilabiate limb of five broad lobes. *l.* ample, pinnate; leaflets lanceolate, petiolulate, entire. *h.* 50 ft. Tropical Africa, 1858. (B. M. 5091; F. d. S. 830; L. & P. F. G. 104; L. J. F. 388.)

**S. lævis** (smooth-leaved). A synonym of *Newbouldia lævis*.

**SPATHOGLOTTIS** (from *spathe*, a spathe, and *glottis*, a tongue; in allusion to the form of the lip). Including *Pantonia*. ORD. *Orchidææ*. A genus comprising about ten species of mostly stove, terrestrial orchids, natives of the East Indies, South China, the Malayan Archipelago, the Pacific Islands, and Australia. Sepals free, sub-equal, spreading; petals similar, sometimes broader or longer; lip sessile at the base of the column, concave or saccate at base, deeply three-lobed, the middle lobe contracted at the base, and bearing prominent tubercles or calli; pollen masses eight, of which four are usually smaller; bracts erect or deflexed; racemes on erect scapes, leafless, except sheathing scales. Leaves on the caudex solitary or twin, elongated; petioles at length more or less thickened into pseudo-bulbs or tubers. The best-known species are here described. They require similar treatment to *Bletia* (which see).

**S. aurea** (golden). \* *fl.* golden-yellow, marked on the lip with a few dark blood-coloured spots, large, about six borne at the very end of the scape. July. *l.* narrow, resembling those of a Phaius. *h.* 2 ft. Malacca, 1849. A rather handsome species.

**S. Fortunei** (Fortune's). \* *fl.* yellow; sepals ovate, obtuse; petals broader, oblong, sub-sessile; lateral segments of lip blotched with red, oblong, erect, the middle one cuneate and emarginate; column remarkably long and narrow; raceme second, pubescent; bracts acuminate. January. *l.* twin, lanceolate-linear, longer than the pubescent scape. Hong Kong. (Greenhouse. (B. R. 1845, 19.)

**S. Lobbii** (Lobb's). \* *fl.* sulphur-yellow, about 1 in. in diameter, long-stalked; lateral sepals streaked with three or four brown lines; petals broader than the sepals; raceme loose; scape slender, firm, loosely hairy. Burnah, 1876. (G. C. n. s., xviii. p. 532.)

**S. pacifica** (Pacific). \* *fl.*, sepals and petals whitish-lilac, with darker markings; lip lilac, edged with yellow, the two side lobes blunt, curved; front lobe stalked, reniform, undulated, with an orange disk, the stalk having two white tubercles on its base. *l.* oblong-lanceolate. Pseudo-bulbs conical. Pacific Islands, 1883.

**S. Petri** (Peter Veitch's). \* *fl.*, sepals ligulate, acute, and, as well as the much broader petals, dark lilac in colour; lip trifid, purple, with a white disk and a rhomboid callosity, having three furrows and two lines of long hairs between the side lobes, ochre-yellow; bracts large and conspicuous; scape 2 ft. long, green, becoming purplish at the top. *h.* 2 ft. South Sea Islands, 1877. An interesting plant. (B. M. 6354.)

**S. plicata** (folded). \* *fl.* purple; sepals spreading; petals obtuse, connivent; lateral segments of lip truncate, cuneate-oblong, the middle one clawed, with two tubercles at base; bracts petaloid, lanceolate, coloured; scape sometimes 2 ft. high and many-flowered, sometimes 1½ ft. high and two-flowered. June. *l.* many, ensiform, plicate. Java, &c., 1844.

**S. pubescens** (downy). \* *fl.* dirty-yellow, slightly violet at the base of the lip; sepals acute; petals obtuse; lateral lobes of lip erect, the middle one three-keeled, with two tubercles at base; raceme two to eight-flowered, second; scape ascending, pubescent, 1½ ft. long. June. *l.* twin, linear-lanceolate, acuminate at both ends, shorter than the scape. Tubers as large as hazel nuts. Sylhet.

**S. rosea** (rose-coloured). \* *fl.* rose-coloured, pretty, about 1½ in. across; sepals and petals oblong, acute; bracts spreading, as long as the pedicels; scape erect, slender, distantly sheathed, taller than the leaves. July. *l.* lanceolate, plicate, narrowed at base, nearly 2 ft. long. Pseudo-bulbs densely aggregated, three-leaved. Philippines, 1837. SYN. *Pantonia rosea*. (B. R. 1838, 60.)

**S. tomentosa** (tomentose). \* *fl.* crimson; sepals and petals very obtuse; lateral segments of the lip erect, truncate; middle one reniform at apex, the claw elongated; raceme twenty-flowered; bracts and scape coated with a close fur. June. *l.* twin, broadly lanceolate, longer than the scape. Manila.

**SPATHOTECOMA**. A synonym of *Newbouldia* (which see).



FIG. 510. SPATHULATE AND APICULATE LEAF.

**SPATHULATE, SPATULATE**. Oblong, with the lower end attenuated; shaped like a druggist's spatula. A Spathulate and apiculate leaf is shown at Fig. 510.

**SPATHYEMA.** A synonym of *Symplocarpus* (which see).

**SPATULARIA** (of Haworth). Included under *Saxifraga* (which see).

**SPAWN, MUSHROOM.** The underground, vegetating part of the plants of which Mushrooms are the parts devoted to the reproduction of the species. It consists of white threads of mycelium growing among masses of decaying animal or plant remains; e.g., in old hotheds, in stable-yard manure, in droppings of horses or cattle, &c. In artificially-prepared Spawn, the mycelium grows in firm and brick-shaped, or loose, masses of the food (dung, &c.), penetrating into all parts of these, and filling them with the white cells of which it is composed. If kept dry, Mushroom Spawn will remain unchanged for years; but, when a piece of it is placed in a moist bed of manure, or other suitable food, at a temperature of about 60 deg. Fahr., growth goes on vigorously. The new food is traversed by mycelium, and, in a short time, Mushrooms begin to grow upon the surface of the bed. Thus the Spawn does not correspond to seed, but rather may be compared, in its mode of reproducing the species, with the tubers, or so-called *seed*, of potatoes. For the mode of preparing and using Spawn in the artificial cultivation of Mushrooms, see *Mushrooms*.

**SPEARMINT.** See *Mentha viridis* and *Mint*.

**SPEARWORT.** A name applied to several species of *Ranunculus*.

**SPECIES.** "A Species comprises all the individual plants which resemble each other sufficiently to make us conclude that they are all, or may have been all, descended from a common parent. These individuals may often differ from each other in many striking particulars, such as the colour of the flower, size of the leaf, &c., but these particulars are such as experience teaches us are liable to vary in the seedlings raised from one individual" (Bentham).

**SPECKLINIA.** Included under *Pleurothallis* (which see).

**SPECULARIA** (from *Speculum Veneris*, Venus' Looking-glass, the early name of the common European species). SYNS. *Apenula*, *Legouzia*, *Prismatocarpus* (in part). ORD. *Campanulaceae*. A genus comprising about eight species of hardy, erect or decumbent, hispid or glabrous herbs, natives of the Northern hemisphere, one being also found in South America. Flowers sessile or shortly pedunculate in the axils, hibracteate, the upper ones panicle; calyx five-parted; corolla blue, violet, or white, sub-rotate or broadly campanulate, five-lobed; stamens free of the corolla, the filaments flat. Leaves alternate, entire or toothed. The genus is represented in Britain by *S. hybrida*. For culture of the four species described below, see *Campanula*.

**S. hybrida** (hybrid). Corn Violet. *f.* sub-sessile; calyx longer than the floral leaves, shortly angled; corolla blue within, lilac outside, cleft to near the middle. June to September. *l.* small, oblong, waved; radical ones on broad petioles, ovate or spatulate; cauline ones sessile. Stem 6 in. to 10 in. long, erect or decumbent. Europe (Britain), &c. (Sy. En. B. 874, under name of *Campanula hybrida*.)

**S. pentagonia** (five-angled). *f.* blue; calyx shorter than, or as long as, the corolla, with spreading lobes. July. *l.* lower ones obovate, entire; the others ovate-oblong or lanceolate, nearly entire. Stem branched. *h.* 1 ft. Levant, 1586. (B. R. 66, under name of *Campanula pentagonia*.)

**S. perfoliata** (perfoliate). Venus' Looking-glass of North America. *f.* sessile, solitary or two or three together; the upper or later ones only with a conspicuous purplish-blue corolla. May to August. *l.* roundish or ovate, clasping by the heart-shaped base, toothed. *h.* 3 in. to 20 in. North America, 1580.

**S. Speculum.** Speculum Veneris; Common Venus' Looking-glass. *f.* purple; calyx glabrous or pubescent, as long as the corolla, the lobes at length reflexed. July. *l.* similar to those of *S. pentagonia*. Stem branched; branches three-flowered. *h.* 1 ft. Europe, 1586. (B. M. 102 and S. F. G. 216, under name of *Campanula Speculum*.)

**SPEEDWELL.** See *Veronica*.

**SPEIRANTHA** (from *speira*, a coil, and *anthos*, a flower; in reference to the inflorescence). ORD. *Liliaceae*. A monotypic genus. The species is a highly glabrous, stemless, greenhouse plant, with an oblique, thick, stoloniferous rhizome. It was formerly classed under *Albuca* (which see for culture).

**S. convallarioides** (Convallaria-like). *f.*, perianth white or greenish, about 4 in. long, six-parted; stamens six; racemes twenty to thirty-flowered, 1 in. to 2 in. long; scape slender, 3 in. to 4 in. long. June. *l.* six to eight in a rosette, sub-erect, oblanceolate, sessile, 5 in. to 6 in. long, 1 in. to 1 1/2 in. broad, acute. China, 1854. SYN. *Albuca Gardeni* (B. M. 4842).

**SPELT.** See *Triticum Spelta*.

**SPERAGE.** An old name for *Asparagus*.

**SPERGULA PILIFERA.** A synonym of *Sagina pilifera*.

**SPERLINGIA.** A synonym of *Hoya* (which see).

**SPERMACE** (from *sperma*, a seed, and *akoe*, a point; probably alluding to the pointed calyx teeth on the fruit). Button Weed. Including *Bigelovia* (of Sprengel). ORD. *Rubiaceae*. A large genus (about 150 species) of stove, greenhouse, or hardy, low, annual or perennial herbs or sub-shrubs, scattered over tropical and sub-tropical regions. Flowers white, pink, or blue, small or minute, sessile, solitary and axillary, or in fascicles, cymes, heads, or whorls. Leaves opposite, sessile or stalked, membranous or coriaceous. The species, several of which have been introduced, have little horticultural value. *Borreria* (which see) is included here by the authors of the "Genera Plantarum."

**SPERMADICTYON.** A synonym of *Hamiltonia* (which see).

**SPERMXYRUM.** A synonym of *Olaix* (which see).

**SPERMUM.** This term, used in Greek compounds, denotes a seed or any seed-like part, e.g., *Macrospermum*, large-seeded; *Polyspermum*, many-seeded.

**SPHACELE** (from *Sphakos*, the Greek name of Sage, which these plants resemble in foliage). SYN. *Phytaxis* (of Sprengel). ORD. *Labiatae*. A genus of about twenty species of stove or greenhouse shrubs or sub-shrubs; one is a native of the Sandwich Islands, and the rest are mostly Western American, extending from Brazil and Chili to California. Flowers red, violet, blue, or whitish; calyx five-toothed; corolla tube ample; limb short, scarcely bilabiate, four-cleft, with broad, erecto-patent lobes; stamens four; whorls loosely two to six-flowered, or densely six to many-flowered, racemose or spicate. Nutlets ovoid, smooth. Leaves often bullate-wrinkled, and canescent beneath; floral ones reduced to bracts. Three species have been introduced, all requiring greenhouse heat. For culture, see that advised for the tender species of *Salvia*.

**S. cærulea** (blue). *f.* pale lavender-blue, disposed in numerous spikes. *l.* ovate, serrated. 1866. A soft-wooded, winter-blossoming sub-shrub. (F. M. 281.)

**S. campanulata** (bell-shaped). *f.*, calyx four lines long; corolla pale bluish, nearly eight lines long, with broad, crenulated lobes; whorls two-flowered; racemes loose, secund. July. *l.* shortly petiolate, oblong-lanceolate, 3 in. to nearly 1 in. long, narrowed at base; uppermost ones much wrinkled. *h.* 2 ft. to 5 ft. Chili, 1795. Shrub. (B. R. 1382.)

**S. Lindleyi** (Lindley's). *f.*, corolla purplish-violet, twice as long as the calyx, pubescent outside, slightly incurved; whorls many-flowered; raceme simple, dense. July. *l.* ovate, 1 1/2 in. to 3 in. long, cordate at base, much bullate-wrinkled, white-woolly beneath. *h.* 3 ft. to 4 ft. Chili, 1825. Shrub. (B. M. 2993.) SYN. *Stachys Salvia* (B. R. 1226).

**SPHERALCEA** (from *sphaira*, a globe, and *Alcea*, Marsh Mallow; the carpels are disposed in a round head). Globe Mallow. SYNS. *Phymosia*, *Sphæroma*. ORD. *Malvaceae*. A genus comprising about twenty-five species of ornamental, stove, greenhouse, or hardy herbs, sub-shrubs,



**Sphæralcea**—*continued*.

or shrubs, in habit resembling *Malva* or *Malvastrum*; four are natives of the Cape of Good Hope, and the rest inhabit the warmer regions of America. Flowers violet (rarely red) or flesh-coloured, shortly pedicellate (rarely long-pedunculato), solitary or fascicled, axillary, or disposed in terminal racemes or spikes; calyx five-cleft; staminal column more or less divided near the summit into numerous filaments; bracteoles three, free or coalescing at base. Leaves generally angled or lobed. The species described below thrive in a rich, well-drained, loamy soil, and like a light, airy place near the glass. They are readily increased by cuttings of the young growths, inserted in sandy soil, under a bell glass, and kept shaded until rooted.

**S. abutiloides** (Abutilon-like). *fl.* rose-coloured; calyx twice exceeded by the petals; peduncles axillary, one to five-flowered. August. *l.* roundish, angular-lobed, serrate. *h.* 4ft. Bahamas, 1725. Greenhouse shrub. (B. M. 2544, under name of *Malva abutiloides*.)

**S. acerifolia** (Maple-leaved). *fl.* pink; peduncles aggregated, terminal. July. *l.* five-lobed, sub-cordate; lobes acute, dentate or unequally serrate. *h.* 4ft. North-west America, 1861. A half-hardy, stellate-pubescent shrub. (B. M. 5404.)

**S. angustifolia** (narrow-leaved). *fl.* pink; peduncles axillary, solitary or in pairs, one or few-flowered; involucre leaflets bristly, deciduous. August and September. *l.* lanceolate, toothed, powdery. *h.* 3ft. to 4ft. Mexico, 1780. Greenhouse shrub. (B. M. 2839, under name of *Malva angustifolia*.)

**S. elegans** (elegant).\* *fl.* pale, with dark purple veins, from the axils of the upper leaves, usually on short, simple stalks. July. *l.* rather distant, deeply three-lobed or three-parted, on petioles of their own length; lobes cuneate, inciso-pinnatifid, undulated, stellate-tomentose, bluntly toothed. Stems numerous, procumbent or spreading, 2ft. or more long. South Africa, 1791. Greenhouse sub-shrub.

**S. miniata** (vermilion).\* *fl.* vermilion; peduncles axillary, racemose, few-flowered, but sometimes only one-flowered. May to July. *l.* ovate, three-lobed, toothed, tomentose. Stems erect. *h.* 1ft. South America, 1798. Greenhouse sub-shrub. (B. M. 5938; S. B. F. G. ser. ii. 120.)

**S. nutans** (nodding). *fl.* reddish-purple, nodding; peduncles axillary, usually three-flowered, exceeding the leaves; involucre bracts subulate. July. *l.* cordate, five-lobed, unequally crenate-toothed, stellate-tomentose; lobes very acute; stipules filiform. Stem branched. *h.* 2ft. Guatemala (?), 1852. Stove shrub. (F. d. S. 726; L. & P. F. G. iii. p. 173.)

**S. obtusiloba** (obtusely-lobed). *fl.* crowded; petals purple, obovate, with rather dark claws; involucre of three linear leaflets; peduncles axillary and terminal, corymbosely racemose, many-flowered. July. *l.* cordate, somewhat five-lobed, crenate; lobes very blunt. *h.* 3ft to 4ft. Chili, 1827. A stellate-tomentose, greenhouse shrub. (B. M. 2787, under name of *Malva obtusiloba*.)

**S. umbellata** (umbellate). *fl.* of a fiery-violet colour, large; involucre leaflets obovate, somewhat stipitate, deciduous; peduncles axillary, umbelliferous. January to April. *l.* sub-peltate, five-lobed, obtuse. *h.* 10ft. Mexico, 1814. Stove shrub. (L. B. C. 222; B. R. 1608, under name of *Malva umbellata*.)

**SPHÆRENCHYMA.** Spheroidal or spherical, cellular tissue, such as is found in the pulp of fruits.

**SPHÆRIACEÆ.** A large family of Fungi, belonging to the division of **Pyrenomycetes** (which see), provided with perithecia, of leathery or carbonaceous texture, distinct from the stroma, or mycelium, which open by a round hole or pore, sometimes in the wall of the perithecium, but sometimes at the end of a long neck. In this group are various species hurtful to cultivated plants (see **Pleospora**). Several of them show pleomorphism very clearly. Formerly, the family was held to include certain other smaller groups that are now regarded as families distinct from it (e.g., *Dothidiaceæ*, with fleshy, and often bright-coloured, perithecia), to which belong various species (e.g., *Polystigma rubrum* on Plum-leaves) that destroy living plants. The spores and sporidia in *Sphæriaceæ* vary greatly in different genera in complexity of structure, and in the modes of production.

**SPHÆROCARPUS.** A synonym of *Globba*.

**SPHÆROCARYA.** A synonym of *Pyricularia* (which see).

**SPHÆROCHLOA.** A synonym of *Eriocaulon*.

**SPHÆROCIONIUM.** Included under *Hymenophyllum*.

**SPHÆROGYNE.** Included under *Tococa* (which see).

**SPHÆROLOBIUM** (from *sphaira*, a sphere, and *lobos*, a pod; alluding to the globular pods). **ORD. Leguminosæ.** A genus comprising thirteen species of greenhouse, evergreen, glabrous shrubs or under-shrubs, with Rush-like stems, generally leafless, restricted to Australia. Flowers yellow or red, disposed in terminal racemes, or in lateral racemes or clusters; calyx lobes imbricated, the two upper ones falcate, united; petals with short claws; standard orbicular or reniform, emarginate; wings rather shorter. Pods small, oblique, globular, or compressed. Leaves, when present, narrow, entire, alternate or irregularly opposite or whorled. Two of the species have been introduced: these succeed in a compost of loam and peat. Propagation may be freely effected by young cuttings, inserted in sand, under a glass.

**S. acuminatum** (taper-pointed). A synonym of *S. medium*.

**S. medium** (intermediate). *fl.* red or orange, usually numerous, densely clustered in terminal racemes; standard orbicular, rather longer than the calyx. Summer. *l.* on the barren branches small, subulate, often opposite or in whorls of three. Stems erect, 1ft. to 2ft. high; flowering ones leafless. 1803. **SYN. S. acuminatum.**

**S. vineum** (twiggy). *fl.* yellow, numerous, usually clustered two or three together along the smaller branches, forming dense or interrupted, terminal racemes; petals about twice as long as the calyx; pedicels very short. Summer. Stems ascending or erect, from a few inches to 2ft. high, with slender, wiry branches; all leafless, or the barren ones bearing a few scattered, linear or narrow-lanceolate leaves,  $\frac{1}{2}$ in. long. 1802. (B. M. 969; L. B. C. 1753.)

**SPHÆROMA.** A synonym of *Sphæralcea* (which see).

**SPHÆROPHORA** (of Blume). A synonym of *Morinda* (which see).

**SPHÆROPHYSA** (from *sphaira*, a sphere, and *physa*, a bladder; alluding to the shape of the pods). Including *Phyllolobium*. **ORD. Leguminosæ.** A genus comprising three species of hardy, glabrous or hoary, perennial herbs or sub-shrubs, natives of Russian Asia or the Orient. Flowers red, disposed in axillary racemes; calyx teeth sub-equal, or the two upper ones approximating; standard orbicular, laterally reflexed, naked within; wings falcate-oblong; keel incurved at apex, obtuse. Pods long-stipitate, inflated. Leaves imparipinnate; leaflets three or numerous, entire, ex-stipellate. The species, like some other salt-loving plants, are difficult to preserve in gardens. *S. salsula* should be grown in sandy loam, and salted water should be occasionally applied. Propagation may be effected by seeds, which sometimes ripen in this country.

**S. caspica** (Caspian). A synonym of *S. salsula*.

**S. salsula** (salt-loving). *fl.* dirty pale purple, marked with more obscure veins. July and August. *l.* with eight pairs of oval, obtuse, mucronate leaflets. Stems erect, and, as well as the leaves, clothed with adpressed pubescence. *h.*  $\frac{1}{2}$ ft. Russia, Siberia to North China, 1818. **SYN. S. caspica.**

**SPHÆROPSIDÆÆ.** A very large section of Fungi, resembling the *Pyrenomycetes* in external appearance, with pycnidia quite like perithecia except in size, but inclosing no asci, the sporidia being produced singly on the tips of more or less evident stalks, inside the pycnidia (these almost always open by a hole or slit). The plants were formerly regarded as true species, but now they are considered, with good reason, to be only an imperfect stage of species of *Pyrenomycetes*. Many of them grow on living plants, which they destroy or weaken. The leading genera parasitic on living plants are: *Ascochyta*, with two-celled, transparent, pale sporidia; *Diplodia*, with two-celled, brown sporidia; *Hendersonia*,

**Sphærospideæ**—continued.

with brown, oblong or lanceolate sporidia, made up of a row of three or more cells; *Phoma* and *Phyllosticta*,

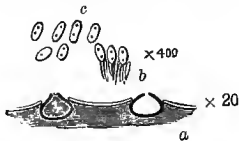


FIG. 511. *PHOMA HERBARUM*.—a, Pycnidia in transverse section,  $\times 20$ , one opened; b, Conidia still on the stalks,  $\times 400$ ; c, Conidia free, after falling off the stalks,  $\times 400$ .

with transparent, elliptical, one-celled sporidia (see Fig. 511); *Septoria*, with long, slender, thread-like, pale sporidia; *Sphærospis*, with elliptical, brown, one-celled sporidia; *Stagonospora*, like *Hendersonia*, but sporidia pale. The pycnidia are very similar in all the genera; but *Ascochyta*, *Phyllosticta*, and *Septoria* usually cause a discoloured spot on the leaves or stems of plants, in which the pycnidia are grouped. Such spots are seldom caused by the species of the other genera.

**SPHÆROPTERIS** (from *sphaîra*, a globe, and *ptêris*, a Fern; alluding to the globose involucre). ORD. *Filices*. A monotypic genus, the species being a stove Fern. For culture, see **Ferns**.

**S. barbata** (bearded). *fronds* 2ft. to 3ft. long, triplininate; pinules oblong, deeply pinnatifid. *sori* globose, on the back of a vein or veinlet; receptacle large; involucre inferior, globose, stipitate, at first inclosing the whole sori, at length bursting vertically into two spreading lobes or lips. Nepal, Sikkim, &c. SYN. *Peranema cyathicoides*.

**SPHÆROSTEMA**. Included under **Schizandra** (which see).

**SPHÆROSTEPHANOS**. Included under *Didymochlena*.

**SPHÆROSTIGMA**. Included under **Cenothera** (which see).

**SPHÆROTELE**. Included under **Stenomesson** (which see).

**SPHAGNUM** (from *Sphagnos*, Moss). A genus of Mosses, found in all countries of the colder temperate zones. There are numerous species, but all delight in swamps, or in water; and they have, therefore, received the name of Bog-mosses. Seventeen species, and many varieties, have been recognised as British. So different is the genus *Sphagnum* from other Mosses in many respects, that it is placed in a distinct family, called *Sphagnaceæ*. It is easily recognised by the swampy habitats; by its erect stems, several inches long, and destitute of root-hairs; branches in clusters of from two to six, at frequent intervals along the stems, some spreading, others reflexed; male organs on lateral branches resembling small catkins; female organs in lateral branches like buds; capsules at first apparently sessile, then supported on short stalks, and conspicuous, globose, and bursting (often explosively) by a false lid, unlike the lids in true Mosses. The microscope shows peculiar structures also in the stems and leaves of *Sphagnum*, which deserve notice here, as they bear on the uses of the Mosses in gardening work. The middle of each stem consists of a mass of small cells, of a brown colour, inclosed in a layer of smaller and darker brown cells, with thicker walls. This structure is much like that of the stem of any common Moss. But the stems of the species of *Sphagnum* have an outer covering, composed of from one to four layers (according to the species) of much larger, transparent cells, with thin walls, which in most are pierced with holes, leading from cell to cell. The leaves are numerous, and are sessile, small, and more or less pointed. They have no

**Sphagnum**—continued.

midribs, and consist of a single layer of cells, among which there are two very different forms—the one long and narrow (inclosing protoplasm and chlorophyl bodies), forming a network, with large meshes, each filled by a transparent cell; the second form usually showing a thickening deposit in the shape of fibres, coiled in the interior round the walls, which are pierced by holes like those in the cells of the layers surrounding the stem. As in the latter, the transparent cells in the leaves, when mature, contain no protoplasm or chlorophyl. Their special duty is to suck in water from the swampy soil through the holes in their walls, and to pass it on from cell to cell upwards. They thus do the work of root-hairs, which are not present in these plants. This structure renders the Mosses of the genus *Sphagnum* almost as absorbent as a sponge, as may be easily proved by squeezing the water out of a clump of Moss, and again dipping the latter into water. The species all grow in compact tufts or mosses, often covering a considerable area. The plants tend to grow upwards, and to die in proportionate rate below. Some of the branches grow so large as to give the appearance of bifurcations of the stems; and, as these die away below, the stems and branches become separated, and form new plants. In this way, one form of multiplication of the individuals is secured. Reproduction is also effected by the spores, produced in the capsules. These are quadrangular in form. If they fall on damp soil, they produce flattened, branched, thin, green plates, on which Moss-plants grow from small buds. If the spores fall into water, they produce slender, branched, green threads, like those of other Mosses; and on these buds are formed, from which the Moss-plants grow.

The Bog-mosses are very important agents in the production of Peat Mosses and swamps, as they prevent the water from flowing away, and, by growing upwards and dying away beneath, add to the depth of the peat, though peat formed by them requires a long time to become firm suitable for fuel.

*Uses*. In gardens, *Sphagnum* is of much use, inasmuch as, when dry, it makes admirable packing material, being light, firm, and very elastic. The power of absorbing and retaining moisture renders the wet *Sphagna* excellent for packing round cuttings and young plants to be sent to a distance, as they supply water when it is needed. These Mosses are also much used in greenhouses for growing epiphytal Orchids or other plants of similar habits, which require plenty of moisture.

**SPHENANDRA** (from *sphen*, a wedge, and *aner*, andros, a male or anther; alluding to the shape of the anthers). ORD. *Scrophularinææ*. A monotypic genus. The species is a greenhouse, viscous-pubescent, annual or perennial herb. It thrives in loamy soil, and may be increased by seeds.

**S. viscosa** (clammy). *fl.* violet, pedicellate, loosely racemose; calyx five-parted; corolla broadly rotate, with five broad, entire, spreading lobes; stamens four. *June*. *l.* mostly opposite, oblong-lanceolate, with a few teeth; floral ones much smaller, ovate, entire, very acute or bract-like. *h.* 1ft. South Africa, 1773. (*B. M.* 217, under name of *Buchnera viscosa*.)

**SPHENODESMA** (from *sphen*, a wedge, and *desme*, a fascicle; alluding to the form of the inflorescence). SYN. *Roscoea* (of Roxburgh), *Viticastrum*. ORD. *Verbenaceæ*. A genus consisting of about eight species of stove, climbing shrubs, natives of the Eastern provinces of India and the Malayan Archipelago. Flowers in rather small, pedunculate, sessile cymes; calyx five-toothed; corolla tube short, the limb spreading, of five ovate or oblong lobes; stamens five. Leaves opposite, entire. *S. pentandra*, the only species introduced, thrives in sandy loam. It may be increased by cuttings, inserted in sand, under a glass, in heat.

**Sphenodesma**—*continued*.**S. Jackiana** (Jack's). A synonym of *S. pentandra*.**S. pentandra** (five-anthered). *fl.* six in a head; corolla purple, the tube equalling the calyx, the throat white and very hairy; panicle ample, leafy below; peduncles filiform. June. *l.* shortly petiolate, oblong, obtuse at base, attenuated-acuminate, highly glabrous and shining above, pubescent beneath. *h.* 6ft. East India, 1823. SYN. *S. Jackiana*.**SPHENOGYNE**. Included under **Ursinia** (which see).**SPHENOTOMA**. Included under **Dracophyllum** (which see).**SPHEROIDAL**. Approaching a sphere in shape.**SPHINGIDÆ** (Hawk Moths). A family of Moths of very distinct and striking aspect, characterised by the thick, heavy body, and long, pointed wings, which are moved by powerful muscles. This allows of very rapid flight, except in a few (*Smerinthus*), in which the wings are broader, but weaker, and flight is slow and heavy. The moths are large, certain species, *e.g.*, Death's Head Moths, being among the largest of British insects. The antennæ are usually thicker in the middle, and end in a hooked bristle. The larvæ are generally peculiar in form, being rather thick, tapering from a little in front of the middle towards the head, but cut off abruptly behind, where a curved "horn" is present just above the blunt hinder end. Most of the larvæ are ornamented with seven oblique coloured lines on the sides. Those of several species have a habit of drawing back the head into the segments just behind it, and assume an attitude fancifully supposed to resemble the Egyptian Sphinx; and from this habit the family name has been derived. The popular name of "Hawk Moths" refers to their swiftness of flight. They mostly fly in the dusk of evening and of early morning; but one, the Humming Bird Moth, flies by day. Several of the species feed, as larvæ, upon garden produce, or on bushes and trees. *Acherontia Atropos* (formerly called *Sphinx Atropos*), the Death's**Sphingidæ**—*continued*.

rosy-brown wings, clouded with olive-brown markings, and especially by a large, bluish, eye-like spot on each hind wing near the hind angle. The larva is green, with a blue horn; the seven oblique stripes on each side are white, edged with dark green above. The Poplar Hawk Moth (*S. Populi*) lives on Poplars and Willows, and on Laurel and Lamrstinus. The moth reaches about 3in. across the wings, which are grey, with darker bands and a white dot in the middle of each fore wing, and a red patch at the base of each hind wing. The larva is green, sprinkled with yellow; the horn is yellow above, redder beneath; and the oblique stripes on the sides are yellow. This insect is the most plentiful of the family. The Lime Hawk Moth (*S. Tiliae*) is less common. The moth reaches from 2½in. to 3in. across the wings. The fore wings have the outer edge a good deal indented; they are pale reddish or olive-brown, with a broad, greenish outer border, and a dark olive-green band across the middle, often broken so as to form two spots. The hind wings are blackish at the base, brown elsewhere, with a darker band across each. The larva feeds on Limes and Elm-trees. It is green, sprinkled with yellow dots, and the oblique stripes are yellowish, sometimes edged with red; the horn is blue above, yellow beneath, and behind it is a flat, purple scale edged with orange. The Privet Hawk Moth (*Sphinx Ligustri*) feeds on Privet and Lilac, and is common in the southern counties of England. The fore wings often exceed 4in. in spread, and are more pointed and narrower than in those insects already mentioned; they are pale brown, clouded with darker brown, and streaked with black; the hind wings are rosy-red, with three black cross-bars. The larva is bright green; the horn is black above and at the tip, and yellow beneath; the oblique streaks on the sides are white behind, delicate purple in front; the skin is smooth. The

large Elephant Hawk Moth (*Chærocampa elpenor*) feeds on Willowherb, Fuchsia, and Vine. The moth reaches 2½in. in spread of the fore wings, which are pointed, and are olive-green, with pink outer and front margins, and two pink, oblique cross-bars; the base of each hind wing is black, and the rest of it pink. The larva is green, dark grey, or brown, with black mottlings. On each side of the fifth and sixth rings of the body is a large black patch, inclosing a white, kidney-shaped spot, the whole resembling an eye. The horn is short and black, with the tip white; the front rings of the body are narrowed and retractile, and when they are retracted the form of the larva has been fancifully compared to an elephant's head, the spots mentioned above resembling the eyes. This moth is common in many places.

**Remedies.** The only remedy necessary is hand-picking the larvæ, if they become so numerous as to require it. Their large size renders them easily seen, though their colours usually

assimilate well with those of their food-plants. The larvæ of *A. Atropos* require to be looked for with a lantern at night, as they hide in the soil by day. The larvæ of almost all the Hawk Moths go underground to become pupæ, and little can be done to diminish the number of pupæ, or of perfect insects. The pupæ of *A. Atropos* are occasionally found when Potatoes are being harvested in gardens and in fields.

**SPHINX ATROPOS.** See **Sphingidæ**.**SPICATE.** Resembling a spike; disposed in spikes.FIG. 512. DEATH'S HEAD HAWK MOTH (*Acherontia Atropos*).

Head Hawk Moth (see Fig. 512), feeds almost entirely on Potatoes (see remarks on INSECTS, under **Potato**), less often on Jasmine and the Tea-tree; but the larva, though very large, is not often seen, because of its habit of feeding only in darkness, concealing itself in the soil by day.

The Hawk Moths that feed on cultivated trees and shrubs are the following: The Eyed Hawk Moth (*Smerinthus ocellatus*), on Apple and other fruit-trees, as well as on Willows, Poplars, &c. The moth reaches about 3in. in spread of wings, and is easily known by the

**SPICE BUSH.** See *Lindera Benzoin*.

**SPICILLARIA.** A synonym of *Petunga* (which see).

**SPIDER FLOWER.** A common name for *Oleome*.

**SPIDER ORCHIS.** See *Ophrys aranifera*.

**SPIDERS.** The true Spiders are very helpful to gardeners, inasmuch as they live upon insects, and destroy multitudes of the hurtful kinds. The larger Spiders, such as the "Garden Spider" (*Epeira diademata*), live on the smaller Moths and the larger Flies, and the smaller Spiders aid largely to destroy the swarms of Aphides. Spiders vary much in habits. Many of them (e.g., *Lycosa*, *Salticus*) spin no webs, but hunt their prey; while others spread webs, often of great complexity and beauty, in which to catch their food, while they lie concealed in a retreat close at hand, ready to rush upon every insect that touches the web. Gossamer is the work of many small, dark Spiders, belonging to the genera *Linyphia*, *Nerine*, and *Walckenaera*.

Red Spider is not a true Spider, but a Mite of microscopic size, which spins a thin web over the surfaces of leaves, and often materially injures plants by sucking out the sap from the leaves. See *Tetranychus telarius*.

**SPIDERWORT.** A common name for *Tradescantia* and other plants.

**SPIELMANNIA.** A synonym of *Oftia* (which see).

**SPIGELIA** (named in honour of Adrian Spiegel [Latinised *Spigelius*], 1578-1625, Professor of Anatomy and Surgery at Padua, and a botanical author). **SYNS.** *Canala*, *Celostylis*. **ORD.** *Loganiaceae*. A genus comprising about thirty species of stove, greenhouse, or hardy, glabrous, scarcely pilose, or stellate-tomentose, annual or perennial herbs, rarely sub-shrubs, natives of tropical and North America. Flowers red, yellow, or purplish, elongated or small, in unilateral, many or few-flowered spikes; calyx five-parted, the segments narrow; corolla tubular or salver-shaped; lobes five, valvate, at length spreading; stamens five, affixed to the tube. Leaves opposite, often membranous, pinniveined or rarely three or five-nerved, connected by stipules or by a transverse membrane. The three species introduced are pretty plants, but are not often seen in cultivation. The Indian Pink, Pink Root, or Worm Grass, of the shops, is the produce of *S. marilandica*. A compost of loam and peat is most suitable for these plants. *S. anthelmia* may be propagated by seeds, and the other two species by cuttings.

**S. anthelmia** (worm-killing). Pink Root of Demerara. *f.* of a purplish-white; corolla slender,  $\frac{1}{2}$  in. long; spikes one to four in the upper axils. July. *l.* scarcely petiolate; lower ones opposite; uppermost ones quaternately whorled, ovate-oblong, acuminate at both ends. *h.*  $\frac{1}{2}$  ft. Guatemala to Brazil, 1759. Stove annual. (B. M. 2359.)

**S. marilandica** (Maryland)\* Indian Pink; Maryland Pink Root; Worm Grass. *f.* red outside, yellow within; corolla  $\frac{1}{2}$  in. long, the lobes lanceolate; spikes simple or forked, short. July. *l.* sessile, ovate-lanceolate, acute. Stems simple and erect from a perennial root. *h.* 6 in. to 18 in. North America, 1694. A showy, hardy plant. (B. M. 80; B. M. Pl. 180; L. B. C. 930.)

**S. splendens** (splendid)\* *f.* bright scarlet, upwards of  $\frac{1}{2}$  in. long; corolla cylindric, slightly inflated upwards; spikes several towards the apex of the stem, elegantly recurved. July. *l.*  $\frac{1}{2}$  in. to  $\frac{5}{8}$  in. long, contracted into a short petiole, obovate-oblong, acuminate, slightly hairy. *h.*  $\frac{1}{2}$  ft. Mexico and Guatemala, 1850. A beautiful, stove perennial. (B. H. 1862, 65; B. M. 5268; R. G. 481.)

**SPIGNEL.** See *Meum athamanticum*.

**SPIKE.** An inflorescence in which the flowers are sessile along a simple, undivided axis or rachis.

**SPIKELET.** A secondary spike; the term is especially applied to the small, terminal collection of florets in grasses.

**SPIKENARD, or NARD.** See *Nardostachys*.

**SPIKENARD, PLOUGHMAN'S.** See *Baccharis*.

**SPILANTHES** (from *spilos*, a spot, and *anthos*, a flower; in allusion to the original species having yellow florets and a brown disk). Sometimes spelt *Spilanthus*. Including *Acemella*. **ORD.** *Compositae*. A genus of about a score species of annual or rarely perennial herbs, inhabiting warm regions. Flower-heads yellow or white, with a yellow disk, often long-stalked, heterogamous. Leaves opposite, often toothed. The species have no garden value. *S. oleracea* (Para Cress) is cultivated in the tropics as a salad plant, and is now and then met with in botanical collections.

**S. crocata.** See *Verbescina crocata*.

**SPILANTHUS.** See *Spilanthus*.

**SPILOSOMA MENTHASTRI.** This insect, generally known as the White Ermine Moth, is one of the commoner of the *Bombycidae*, at least in the larval stage. The larvæ are found in autumn on almost every low plant, including all kinds of cultivated herbs. They reach a length of over  $\frac{1}{2}$  in., are stout in form, and are covered thickly with hairs of a brown or nearly black colour, but show a paler line down the middle of the back. In late autumn, they are commonly seen crawling on roads, on walls, and, in fact, everywhere, in the search for safe retreats in which to become pupæ. In summer, the moths emerge. The fore wings are rather rounded, and reach about  $1\frac{1}{2}$  in. in expanse. They are creamy-white, with about thirty small black spots on each, forming four very irregular, curved rows; the hind wings are pure white, and bear three or four small black spots; the head and thorax are white, the abdomen orange-yellow, with a row of black spots down the middle, and also down each side; the body is thick and clumsy.

**Remedy.** Hand-picking is the most effectual, as the larvæ are easily detected; but they seldom do serious harm; and they may even be regarded as occasionally useful, since they feed on troublesome weeds. The "White Ermine" has allies which feed almost wholly on weeds, viz., the "Buff Ermine" (*S. lubricipeda*), which is buff-colour, with small, dark spots, and a dark, oblique cross-bar; the "Water Ermine" (*S. Urtica*), with the wings white, with two black dots; and the "Muslin Moth" (*Diaphora mendica*), of which the female has semi-transparent white wings, and the male is smoke-coloured; the wings show black spots in both sexes.

**SPINACH** (*Spinacia oleracea*). An annual, cultivated for its leaves, which are cooked and served as a vegetable. It may be raised in any quantity from seed, which should be sown successively through the summer, where the plants are intended to remain. Spinach prefers a deep, rich soil, and a rather moist situation, through the summer; for the winter crop, a drier and rather warm position should be selected. The first sowing may be made at the latter end of February, or early in March, according to the weather and the state of the ground. To maintain a supply, a sowing should be made about every fortnight, or at longer intervals, if there is but little demand for the leaves, as in dry weather the plants soon run to seed. Sow in drills  $\frac{1}{2}$  in. deep, and about  $\frac{1}{2}$  ft. apart. In May, and the two following months, single drills between rows of Beans or Peas may be sown with good success, as here partial shade is provided, and no injury is caused to the other crops, if the ground is good, Spinach being such a quick-growing subject. When the ground is dry, watering is of great advantage, or it may be newly turned up with a fork, and the seeds steeped about four hours in water, then sown at once. In order to obtain good-sized leaves, the plants should be thinned to  $\frac{1}{2}$  in. or 6 in. apart, so soon as they are large enough. In picking, the largest leaves should be selected, particularly during winter and early spring, when but little new growth is made.

**Spinach**—*continued*.

Spinach intended for standing through the winter should be sown, according to the locality, from the middle of August till the middle of September, when it is tolerably certain not to run to seed before winter. In unfavourable districts, the former date will not be too soon, while the latter will suit some localities. As before noted, a favoured spot should be selected, and the drills should be rather wider apart than for the summer crops: about 15in. will be close enough. It is often advisable to make two sowings for winter, as, if the first proves too early, the second may be better depended upon to succeed.

**Sorts.** These are not numerous; they are divided into two classes, which are distinguished by the seeds, one being smooth, the other prickly. The Round-seeded, known as Summer Spinach, is most extensively grown in summer; the Prickly, or Winter Spinach, is the hardier of the two, and is sown for withstanding the winter. Flanders Spinach and Lettuce-leaved Spinach are varieties of the Round-seeded class, which are not always distinguished and grown separately from the common sort.

**Fungi.** The only Fungus that has been recorded as seriously destructive to Spinach is *Peronospora effusa*. For an account of this parasite, see **Peronospora**. Plants attacked by it should be removed without delay, and, if possible, burned, to destroy the spores of the Fungus.

**Insects.** The insect pests are not numerous, and there are none that can be regarded as peculiarly attached to this plant. Its chief foes are larvæ of Moths, such as are described under the headings **Noctua**, **Plusia**, **Potherb Moths**, and **Surface Caterpillars**, where also information will be found as to the remedies to be employed against their ravages.

When the plants are allowed to run to seed, the inflorescence is often infested by *Aphis Rumicis*, and other kinds of Green Flies. See **Aphides**.

**SPINACH, MOUNTAIN.** A name applied to *Atriplex hortensis*.

**SPINACH, NEW ZEALAND.** See **Tetragonia expansa**.

**SPINACH, WILD.** A common name for *Chenopodium Bonus-Henricus*.

**SPINACIA** (from *spina*, a prickle; alluding to the prickly processes of the fruit). Spinach. ORD. *Chenopodiaceæ*. A small genus (four species) of hardy, annual, erect, glabrous herbs, natives of the Orient. Flowers dioecious, very rarely hermaphrodite, glomerate; male glomerules in terminal, interrupted spikes, females often axillary. Leaves alternate, petiolate, triangular-ovate or hastate, entire or sinuate-toothed. *S. oleracea*, a valuable herb, is the only species calling for description here. For culture, &c., see **Spinach**.

**S. oleracea** (culinary). *fl.*, males green, growing in long, terminal spikes; females axillary, sessile, clustered. June. Seeds in some varieties prickly, in others smooth. *l.* large, thick, succulent, somewhat triangular, deep green, on long petioles. Stem erect, large, round, hollow, about 2ft. high. 1568. The varieties *glabra* and *spinosa* represent the ROUND and PRICKLY SEEDED varieties.

**SPINDLE-TREE.** See **Euonymus**.

**SPINE.** A sharp-pointed, woody or indurated body; a hardened leaf-stalk, stipule, abortive branch, or any other process into the composition of which woody tissue enters.

**SPINESCENT.** Terminating in a sharp point or spine.

**SPINOSE.** Furnished with spines; of a spiny character.

**SPINULIFEROUS, SPINULOSE.** Furnished with diminutive spines.

**SPIRÆA** (the old Greek name used by Theophrastus, probably from *speira*, to wind; alluding to the fitness of the plants for forming into garlands). Meadow-sweet. ORD. *Rosaceæ*. A genus comprising about fifty species of handsome (mostly deciduous and hardy) shrubs, sub-shrubs, or herbs, broadly dispersed over the temperate and sub-frigid regions of the Northern hemisphere, rarely found in the tropics. Flowers pink or white, axillary or terminal, variously clustered; calyx persistent, with an urceolate, campanulate, or concave tube, and a limb of four or five imbricated or valvate lobes; petals four or five, rounded, shortly clawed; stamens twenty to sixty, in one, two, or three series. Leaves alternate, simple or pinnate, or twice or thrice ternate; stipules free, or adnate in a sheath at the bases of the petioles, rarely obsolete. The shrubby species succeed in almost any soil in open situations. The perennials prefer moist places and loamy soil, particularly *S. palmata* and *S. Ulmaria*, which succeed well by the side of water. Shrubby Spiræas are propagated by cuttings of the young wood, inserted in sandy soil, and kept close and shaded until rooted; or by means of the root-offsets which are so freely produced by most of the species. The perennials may be increased by divisions.

A modification of Maximowicz' key to the genus is given below. Some of the sections are looked upon as distinct genera by that author.

**Aruncus.**

Flowers dioecious; calyx withering in fruit, hypogynous with the stamens. Carpels normally three, cartilaginous. Leaves repeatedly divided in a ternate manner.

Aruncus  
astilloides

**Eriogynia.**

Flowers hermaphrodite; calyx persistent in fruit, perigynous with the stamens. Carpels two-valved, membranous, free; seeds resembling sawdust. Leaves twice ternately divided.

pectinata

**Spiræa proper.**

Flowers hermaphrodite, rarely polygamous; calyx persistent in fruit, perigynous with the stamens. Carpels one-valved, cartilaginous, free; seeds several, more or less appendiculate; albumen none or almost obsolete.

**SECTION I. PETROPHYTUM.**

Flowers racemose; pedicels of equal length, sometimes very short. caespitosa

**SECTION II. CHAMEDRYON.**

Flowers not truly racemose; pedicels of the corymbs or clusters one-flowered, of unequal length.

*Series 1.* Leaves of the flowering and sterile branches somewhat dissimilar, commonly very short.

alpina  
crenifolia  
hypericifolia  
prunifolia flore-pleno  
Thunbergii

*Series 2.* Leaves of the flowering and sterile branches similar, usually elongated.

Blumei  
cana  
cantoniensis  
chamedrifolia  
chinensis  
media  
pubescens  
trilobata

**SECTION III. SPIRARIA.**

Corymbs or panicles compound.

*Series 1.* Flowers corymbose.

bella  
betulifolia  
canescens  
decumbens  
gracilis  
japonica  
vaccinifolia

*Series 2.* Flower paniculate.

Douglasii  
salicifolia  
tomentosa

**Sibiræa.**

Flowers paniculate, dioecious.  
lavigata

**Spiræa—continued.****Holodiscus.**

Flowers in ample, many-flowered, terminal panicles; stamens longer than the petals.

discolor

**Filipendula.**

Herbaceous perennials. Flowers in axillary or terminal cymes. Leaves interruptedly pinnate.

Filipendula

lobata

palmata

Ulmaria

vestita

**Sorbaria.**

Ovules pendulous; carpels coriaceous, cohering at the base, completely splitting into two halves; seeds several. Leaves large, membranous, pinnately divided.

grandiflora

Lindleyana

sorbifolia

**Chamaebatiaria.**

Leaves bipinnatisect, Milfoil-like.

Millefolium.

The most popular species and varieties are here described. Except where otherwise indicated, all are hardy, deciduous shrubs.



FIG. 513. UPPER PORTION OF PLANT OF SPIRÆA ARUNCUS.

**S. acutifolia** (acute-leaved). A synonym of *S. hypericifolia acuta*.

**S. alba** (white). A synonym of *S. salicifolia paniculata*.

**S. alpina** (alpine). *fl.* white; sepals ascending; corymbs terminal, stalked, and in many instances leafless, large in proportion

**Spiræa—continued.**

to the leaves. June and July. *l.* oblong-lanceolate, sessile, serrulated, glabrous; midrib pinnately branched. *h.* 4ft. to 6ft. Siberia, 1806.

**S. amurensis** (Aimur). A synonym of *Neillia amurensis*.

**S. arisæfolia** (White-beam-leaved). A synonym of *S. discolor arisæfolia*.

**S. Aruncus** (Aruncus). Goat's Beard. *fl.* whitish, in many slender spikes, disposed in a long, compound panicle. June. *l.* thrice-pinnate; leaflets thin, lanceolate-oblong, or the terminal ones ovate-lanceolate, taper-pointed, sharply cut and serrated. *h.* 4ft. Northern hemisphere, 1633. Herbaceous perennial. See Fig. 513.

**S. A. americana** (American). A form with the interrupted male flowers scarcely larger than the female ones. Follicles more than twice as long as broad. North America, Japan, and China. In the Japanese Alps, this sometimes occurs only 1ft. in height.

**S. A. triternata** (triternate). *fr.*, carpels twice (often more than three times) as long as broad. *l.* frequently clothed with ashy pubescence beneath. Himalaya.

**S. astilboides** (Astilbe-like). *fl.* white, in spicate panicles. Summer. Japan. In general aspect, this species resembles *S. Aruncus*, but it is considerably dwarfer in stature, and much more graceful in character. A handsome perennial. See Fig. 514, for which we are indebted to Mr. Wm. Bull.

**S. barbata** (bearded). A synonym of *Astilbe japonica*.

**S. bella** (pretty). *fl.* of a beautiful red colour; calyx lobes deflexed; cymes terminal, spreading, and, as well as the branches, pubescent. July and August. *l.* ovate, glabrous, serrated, petiolate, glaucous beneath. Stems glabrous, rufous. *h.* 2ft. to 3ft. Himalaya, 1820. (B. M. 2426.)

**S. betulifolia** (Birch-leaved). *fl.* creamy-white; corymbs large, flat, several times compound. June. *l.* simple, oval or ovate, cut-toothed towards the apex; stipules obsolete. *h.* 1ft. to 2ft. North-eastern Asia and North America, 1819. Shrub nearly smooth. SYN. *S. corymbosa* (L. B. C. 671).

**S. Blumei** (Blume's). *fl.* white; cymes pedunculate, terminal, and, as well as the calyx, glabrous. *l.* obovate, obtuse, deeply toothed at the apex, rather smooth. *h.* 5ft. to 6ft. Japan. (B. H. 1858, 37, t. 2.)

**S. Boursierii** (Boursier de la Rivière's). A synonym of *S. discolor dumosa*.

**S. caespitosa** (tufted). *fl.* white, densely spicate-racemose. Summer. *l.* small, silky, entire; radical ones rosulate, spatulate; cauline ones linear, minute. *h.* 6in. Northern Mexico, Nevada, &c.

**S. callosa** (callous-leaved). A synonym of *S. japonica*.

**S. c. alba** (white). A synonym of *S. japonica alba*.

**S. c. rosea** (rosy). A synonym of *S. japonica splendens*.

**S. c. superba** (superb). A synonym of *S. japonica superba*.

**S. cana** (hoary-leaved). *fl.* white; sepals spreading; styles thick; corymbs somewhat racemose, the lateral ones pedunculate, loosely few-flowered. June and July. *l.* ovate,  $\frac{1}{2}$ in. to  $\frac{1}{4}$ in. long, acute, quite entire or slightly toothed, hoary-villous. *h.* 1ft. to 2ft. Croatia, 1825.

**S. canescens** (hoary). *fl.* pale pink or white; corymbs crowded, and, as well as the branches, tomentose. Summer. *l.* oval or obovate, obtuse, stalked, quite entire, villous. Himalaya, 1879. An erect, branched, canescent shrub, with the habit of *S. hypericifolia*.

**S. cantoniensis** (Canton)\* *fl.* white and showy, disposed in terminal umbels. Early summer. *l.* small, simple, lanceolate, three-lobed, deeply toothed. *h.* 3ft. to 4ft. Japan, 1843. A glabrous, hardy, evergreen shrub. SYN. *S. Reevesiana* (B. R. xxx. 10). There is a double-flowered variety of this species in cultivation, which is highly desirable. (F. d. S. 1097.)

**S. ceanothifolia** (Ceanothus-leaved). A synonym of *S. chamaedrifolia*.

**S. chamaedrifolia** (Germander-leaved). *fl.* white, disposed in hemispherical corymbs; sepals reflexed; pedicels slender, elongated. June and July. *l.* ovate, deeply serrated at the apex, pubescent. *h.* 1ft. to 2ft. South-eastern Europe to Japan, &c., 1783. SYN. *S. ceanothifolia*.

**S. c. flexuosa** (flexuous). *fl.* generally smaller than those of the type. *l.* elliptic-lanceolate, unequally serrated, hardly incised. Eastern Siberia, &c. SYN. *S. flexuosa*.

**S. c. ulmifolia** (Elm-leaved). *fl.* white, disposed in nearly



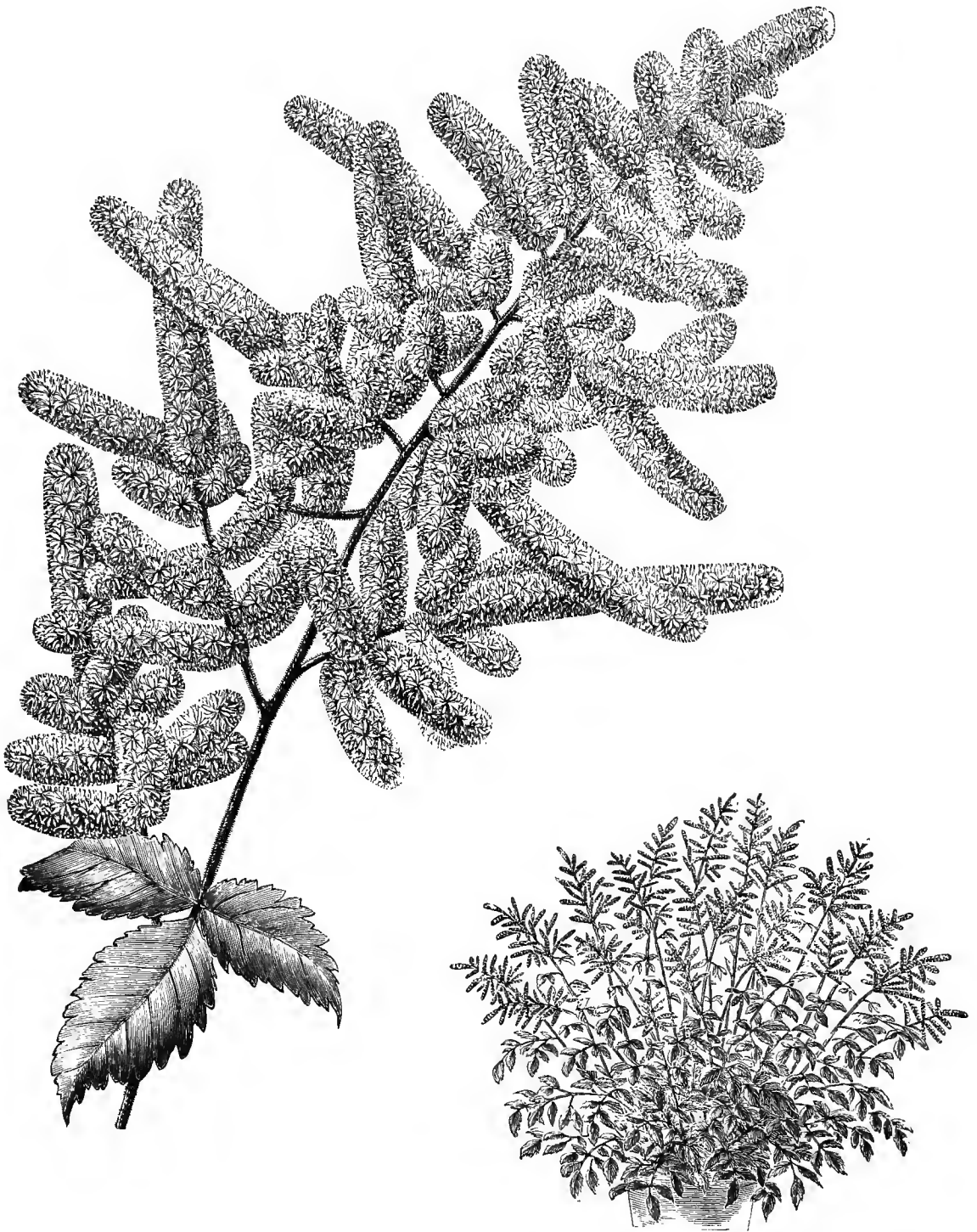


FIG. 514. *SPIRÆA ASTILBOIDES*, showing Habit and detached Inflorescence.

**Spiræa**—continued.

hemispherical, terminal corymbs; sepals reflexed. June and July. *l.* ovate-lanceolate, acute, flat, sharply serrated, glabrous. *h.* 3ft. to 5ft. Siberia, &c., 1790. A handsome shrub. (B. R. 1222 and L. B. C. 1042, under name of *S. chamaedrifolia*.)

**S. chinensis** (Chinese). *fl.* pure white, small, slightly fragrant, arranged in small, hemispherical corymbs. March. *l.* ovate-oblong, 1½ in. long, acute, much wrinkled, deeply serrated, subtrilobed, beneath, as well as on the branches, pubescent. *h.* 2ft. Central China, 1843. SYN. *S. pubescens*, of Lindley (B. R. xxxiii. 38).

**S. confusa** (confused). A synonym of *S. media*.

**S. corymbosa** (corymbose). A synonym of *S. betulifolia*.

**S. crenifolia** (crenate-leaved). *fl.* white, in many-flowered, racemose corymbs, generally subtended by foliaceous bracts; stamens longer than the petals. Summer. *l.* stalked, round-oval, sharply toothed, rarely entire. North-east Asia.

**S. decumbens** (decumbent). *fl.* white, in terminal corymbs. Summer. *l.* roundish-oval, crenately-toothed. Tyrol. A dwarf,

**Spiræa**—continued.

trailing shrub, suitable for covering rocks and banks. (G. C. n. s., xii., p. 752.)

**S. discolor arisæfolia** (discoloured, White-beam leaved). *fl.* dirty-white, in elegant, nodding panicles. Summer. *l.* rigid, cuneate at base, dark green above, silvery beneath; those on young growths about the size and shape of those of the Hawthorn. *h.* 4ft. to 10ft. North-west America. SYN. *S. arisæfolia* (B. R. 1365).

**S. d. dumosa** (brambly). This differs from the last-named plant in its less compound panicles and much smaller stature. See Fig. 515. SYNS. *S. Bourserii* (R. H. 1859, 519), *S. dumosa*.

**S. Douglasii** (Douglas'). *fl.* rose-coloured, nearly sessile, in a dense, terminal, thyrsoid panicle, 6in. to 9in. in length. August. *l.* simple, oblong-lanceolate, obtuse, serrulated towards the apex, covered with a white down beneath. *h.* 3ft. North-west America. (B. M. 5151; L. & P. F. G. ii. 178; R. H. 1846, 6.)

**S. D. Nobleana** (Noble's). *fl.* purplish-red; inflorescence looser than in the type. *l.* elliptic or oblong, obtuse or acute, more or less toothed, pubescent or almost glabrous beneath. California, 1859. (B. M. 5169 and I. H. 285, under name of *S. Nobleana*.)

**S. dumosa** (brambly). A synonym of *S. discolor dumosa*.

**S. Filipendula** (Filipendula). \* Dropwort. *fl.* white, or rosy outside, ½ in. in diameter; cymes loose, paniced; peduncles slender. June and July. *l.* interruptedly pinnate, glabrous, 4in. to 10in. long, chiefly radical; leaflets many, sessile, deeply cut-serrate, ½ in. to 1in. long, the terminal one three-lobed; stipules of cauline leaves toothed. Stem 2ft. to 3ft. high, erect, grooved, with a few small leaves. Europe (Britain), &c. Tuberous, herbaceous perennial. See Fig. 516. (Sy. En. B. 416.) There is a form of this with double flowers.

**S. flagellata** (whip-like). A synonym of *S. hypericifolia*.

**S. flexuosa** (flexuous). A synonym of *S. chamaedrifolia flexuosa*.

**S. Fortunei** (Fortune's). A synonym of *S. japonica*.

**S. gracilis** (slender). *fl.* white, corymbose (with long, capillary pedicels); corymbs in lax, spreading, rounded, glabrous panicles. July and August. *l.* obtuse or orbicular, elliptic, glabrous, glaucous beneath, serrated at the apex. Branches hairy. *h.* 2ft. Nepal, 1820. (L. B. C. 1403, under name of *S. vacciniifolia*.)

**S. grandiflora** (large-flowered). *fl.* white, corymbose. July and August. *l.* pinnate; leaflets serrately incised. *h.* 2ft. to 3ft. Siberia, &c. Sub-shrub. This much resembles *S. sorbifolia*, but the flowers are twice as large as those of that species, and the leaves are smaller. SYN. *S. Pallasi*.

**S. grandiflora** (large-flowered), of Hooker. A synonym of *Ecochorda grandiflora*.

**S. grandiflora** (large-flowered), of Loddiges. A synonym of *S. salicifolia grandiflora*.

**S. hydrangæefolia** (Hydrangea-leaved). A synonym of *S. japonica splendens*.

**S. hypericifolia** (Hypericum-leaved). *fl.* white, in either peduncled corymbs or sessile umbels; pedicels glabrous or slightly downy. June and July. *l.* obovate-oblong, three or four-nerved, entire or toothed, glabrous, slightly downy. *h.* 4ft. to 6ft. Asia Minor to Eastern Siberia, &c., 1640. SYN. *S. flagellata*.

**S. h. acuta** (acute-leaved). *fl.* in sessile corymbs. *l.* spatulate, elongated, acute, perfectly entire or rarely three to five-toothed, rather glabrous. SYN. *S. acutifolia*.

**S. h. Besseri** (Besser's). *fl.* in rather loose, terminal corymbs. *l.* mostly entire. Plant rather glabrous. (L. B. C. 1252.)

**S. h. crenata** (crenate-leaved). A variety with obovate leaves.

**S. h. thalictroides** (Meadow-rue-leaved). *fl.* in a few-flowered, sessile corymb; stamens as long as the petals. June and July. *l.* smooth, glaucous, obovate, entire; those on the barren shoots cuneate-obovate or subdeltoid. Mongolia. SYN. *S. thalictroides*.

**S. japonica** (Japanese). *fl.* rosy-red, disposed in terminal, flat corymbs. June. *l.* glabrescent, simple, lanceolate, acute, sharply serrated; serratures thickened at the tips.



FIG. 515. FLOWERING BRANCH OF SPIRÆA DISCOLOR DUMOSA.

**Spiræa**—continued.

*h.* 4ft. to 6ft. China, Japan, &c., 1859. A very handsome and desirable, greenhouse, evergreen shrub. **SYNS.** *S. callosa* (L. & P. F. G. II. 191), *S. Fortunei* (B. M. 5164; F. d. S. 871).



FIG. 516. INFLORESCENCE OF SPIRÆA FILIPENDULA.

- S. j. alba** (white). *fl.* white. A compact, pretty hush, not more than 1ft. high. **SYN.** *S. callosa alba*.
- S. j. rubra** (red). A very handsome variety, having dark red flowers (R. H. 1862, p. 100.)
- S. j. splendens** (splendid). *fl.* peach-coloured. A dwarf-growing, floriferous plant, adapted for forcing. Garden origin. **SYNS.** *S. callosa rosea*, *S. hydrangeefolia*, *S. splendens*.
- S. j. superba** (superb). *fl.* deep rose-red. A fine garden form. **SYN.** *S. callosa superba*.
- S. japonica** (Japanese), of gardens. The plant commonly known by this name is **Astilbe japonica** (which see).
- S. lævigata** (smooth). *fl.* white, tinged with rose, diœcious; male panicles larger and looser, in longer, interrupted racemes; female panicles smaller and more dense, in closely-packed, continuous racemes of smaller flowers. June. *l.* entire, oblong-lanceolate, glaucous, glabrous. *h.* 2ft. to 3ft. Siberia.
- S. laxiflora** (loose-flowered). A synonym of *S. vacciniifolia*.
- S. Lindleyana** (Lindley's)\*. *fl.* white, disposed in large, terminal panicles. September. *l.* large, unequally pinnate; leaflets eleven to twenty-one, sessile, ovate-lanceolate, coarsely serrated, glaucous beneath. *h.* 4ft. to 8ft. Himalayas. (B. R. 33.)
- S. lobata** (lobed). Queen of the Prairie. *fl.* deep peach-blossom colour, handsome; sepals and petals often in fours; panicle compound-clustered. June. *l.* interruptedly pinnate; terminal leaflet very large, seven to nine-parted, the lobes incised and toothed; stipules reniform. *h.* 2ft. to 8ft. North America, 1765. A glabrous, herbaceous perennial. The bruised foliage exhales the odour of Sweet Birch. (R. G. 397.) **SYN.** *S. venusta* (of gardens).
- S. l. albicans** (whitish). A chance seedling, raised near Metz, differing from the type in its lighter rose-coloured flowers. **SYN.** *S. venusta albicans*.
- S. media** (intermediate). *fl.* white, corymbose; stamens longer than the petals. June and July. *l.* elliptic-lanceolate, acute, more or less serrated, three or four-ribbed, hairy beneath, rarely entire or with a few large teeth towards the apex. Branches terete, sub-erect. *h.* 2ft. to 4ft. Northern Asia, &c. **SYNS.** *S. confusa*, *S. oblongifolia*.
- S. m. rotundifolia** (round-leaved). *fl.* pure white, scented, corymbose, abundantly produced. *l.* elliptic, three-toothed at apex. Japan, 1885. A handsome garden variety. (G. C. n. s., xxiii. 56.)

**Spiræa**—continued.

**S. Millefolium** (Milfoil-leaved). *fl.* whitish, in many-flowered racemes at the tips of the branches. Summer. *l.* glabrous above, stellate-tomentose beneath, much resembling in cutting those of the common Milfoil. California, &c., 1880. A low, evergreen shrub. **SYN.** *Chamaebatiaria Millefolium*.

**S. Nobleana** (Noble's). A variety of *S. Douglasii*.

**S. oblongifolia** (oblong-leaved). A synonym of *S. media*.

**S. opulifolia** (Guelder Rose-leaved). A synonym of *Neillia opulifolia*.

**S. Pallasii** (Pallas'). A synonym of *S. grandiflora*.



FIG. 517. SPIRÆA PALMATA.

- S. palmata** (palmate-leaved)\*. *fl.* of a brilliant crimson, disposed in large, corymbose panicles. June to August. *l.* palmately five to seven-lobed; lobes oblong, acuminate, acutely and doubly serrated. Stems (as well as the peduncles) crimson. *h.* 1ft. to 2ft. Japan, 1823. A beautiful, herbaceous perennial; it is one of the most striking and effective species in cultivation. See Fig. 517. (B. M. 5726.)
- S. p. alba** (white). This differs from the type in its white flowers and lighter green leaves.
- S. p. elegans** (elegant). A very fine garden plant, having large, paniculate corymbs of white flowers with red anthers, and pinnatisect leaves. 1878. (F. & P. 1878, 463.) Although figured under this name, and reputed to be a hybrid between *S. palmata* and *Astilbe japonica*, this probably has nothing to do with either of the plants named, and may, after all, only be a form of *S. Utmara*.
- S. p. purpurascens** (purplish). A form with purplish-tinted foliage.
- S. paniculata alba** (white-panicked). A synonym of *S. salicifolia paniculata*.
- S. pectinata** (comb-like). *fl.* whitish; raceme woolly, often compound, somewhat capitate, elongated in fruit. Summer. *l.* rigid, much attenuated and linear at the base, twice or thrice three-cleft; lobes linear, acute. Stems tufted, creeping; branches short, erect, leafy. *h.* 6in. to 12in. North America. Herbaceous perennial. (H. F. B. A. i. 28.)
- S. prunifolia flore-pleno** (Prunus-leaved, double-flowered)\*. *fl.* pure white, produced in fascicles along the whole length of the branches. Spring. *l.* small, glabrous, connate at base, and irregularly serrated in the upper half. *h.* 3ft. China and Japan, 1845. One of the most familiar garden plants in the genus. (S. Z. F. J. i. 70.)
- S. pubescens** (downy). *fl.* white; sepals erect; corymbs hemispherical. March. *l.* ovate-oblong, incised-serrated, pubescent beneath. *h.* 2ft. Mongolia, 1843.
- S. pubescens** (downy), of Lindley. A synonym of *S. chinensis*.
- S. Reevesiana** (Reeves'). A synonym of *S. cantoniensis*.
- S. reticulata** (netted). A synonym of *Astilbe japonica variegata*.
- S. rhamnifolia** (Rhamnus-leaved). A synonym of *S. vacciniifolia*.
- S. salicifolia** (Willow-leaved). *fl.* rosy or pink, disposed in terminal, racemose, dense, sub-cylindric cymes. July and August. *l.* oblong-lanceolate, glabrous, from 2in. to 3in. long, equally or

**Spiræa**—continued.

unequally serrated. Stems 3ft. to 5ft. high, stoloniferous. Europe (naturalised in Britain).

**S. s. alpestris** (alpine). *l.* shorter than those of *S. s. carnea*. Branches very short. A small shrub.

**S. s. carnea** (flesh-coloured). *fl.* flesh-coloured; panicles consisting of more or less spicate racemes. *l.* lanceolate. Bark of the branches yellowish.

**S. s. grandiflora** (large-flowered). *fl.* pink, twice as large as those of the type. An ornamental, tree-growing shrub. (L. B. C. 1988, under name of *S. grandiflora*.)

**S. s. latifolia** (broad-leaved). *fl.* white. *l.* ovate-oblong. Bark of the branches reddish.

**S. s. paniculata** (panicked). *fl.* white, in large, branching panicles. Bark of branches reddish. **SYNS.** *S. alba* (G. C. n. s., xii., p. 753; W. D. B. 33), *S. paniculata alba*.

**S. sorbifolia** (Sorbus-leaved). *fl.* white, disposed in a thyrs-like panicle. July and August. *l.* stipuled, pinnate; leaflets sessile, opposite, lanceolate, doubly and sharply serrated. *h.* 3ft. to 6ft. Siberia, 1759.

**S. splendens** (splendid). A synonym of *S. japonica splendens*.

**S. thalictroides** (Meadow-rue-leaved). A synonym of *S. hypericifolia thalictroides*.

**S. Thunbergii** (Thunberg's). *fl.* white, axillary, mostly ternate; ovary free, not inflated. Spring. *l.* exstipulate, linear or linear-lanceolate, attenuated and acute at both ends, mostly argutely serrated, entire, glabrous on both sides. *h.* 1ft. to 3ft. Japan. (S. Z. F. J. i. 69.)

**S. tomentosa** (tomentose). *fl.* rose-coloured or rarely white, in short racemes, crowded into a dense panicle. July. *l.* simple, ovate or oblong, serrated; under surface (as well as the stems) very woolly. *h.* 3ft. North America, 1736. (T. S. M. 485.)

**S. trifoliata** (three-leaved). A synonym of *Gillenia trifoliata*.

**S. trilobata** (trilobed-leaved). *fl.* pure white; sepals ascending; corymbs numerous, compact, umbel-like. May. *l.* roundish, lobed, crenate, glabrous, reticulately veined. Branches ascending horizontally. *h.* 1ft. to 2ft. Altaian Alps, 1801. A very handsome, low, erect shrub. (W. D. B. 68, under name of *S. triloba*.)

**S. Ulmaria** (Ulmaria). \* Queen of the Meadows; common Meadow-sweet, &c. *fl.* white, ½ in. to ¾ in. in diameter; cymes corymbose, very compound, 2 in. to 6 in. in diameter, pubescent. June to August. *l.* interruptedly pinnate, white and downy beneath; radical ones 1ft. to 2ft. long; terminal leaflet 1 in. to 3 in. long, acutely lobed; lateral ones entire, alternate, very small; stipules leafy, half-ovate, toothed. Stems 2ft. to 4ft. high, erect, furrowed. Europe (Britain), &c. Herbaceous perennial. (Sy. En. B. 415.)

**S. U. phyllantha** (leaf-flowered). *fl.*, sepals distinct, stipitate, transformed into whorled, lanceolate, sharply-serrated leaves; petals and stamens wanting, or, if present, more or less deformed.

**S. vacciniifolia** (Whortleberry-leaved). *fl.* white, in large, loose, shaggy panicles. July and August. *l.* smooth, ovate, crenate, on long petioles, glaucous beneath. Branches weak, round, downy. *h.* 1ft. to 2ft. Himalaya, 1838. **SYNS.** *S. laxiflora* (L. & P. F. G. ii. 185), *S. rhumifolia*.

**S. venusta** (charming). A garden synonym of *S. lobata*.

**S. v. albicans** (whitish). A synonym of *S. lobata albicans*.

**S. vestita** (clothed). *fl.* white, ½ in. in diameter; calyx lobes obtuse; cymes oblong, much-branched, very many-flowered. June. *l.* pinnatisect, sometimes hoary with thick white tomentum beneath; lateral leaflets small or wanting; terminal one 2 in. to 6 in. in diameter, palmately three to five-lobed, the lobes acutely lobulate and toothed. *h.* 1ft. to 1½ ft. Himalayas, 1838. Perennial. (B. R. 1841, 4, under name of *S. kamischaticca himalensis*.)

**SPIRAL.** Appearing as if wound round an axis.

**SPIRANTHERA** (from *speira*, a spiral, and *anthera*, an anther; alluding to the spiral anthers). **SYN.** *Terpanthus*. **ORD.** *Rutaceæ*. A monotypic genus. The species is a very handsome, sweet-scented, highly glabrous, stove, evergreen shrub. It thrives in a compost of peat and sandy loam. Propagation may be effected by cuttings of half-ripened wood, inserted thinly in sand, under a glass, which must be occasionally removed in order to prevent them from damping off, which they are otherwise likely to do.

**S. odoratissima** (very sweet-scented). *fl.* white, showy, sweet-scented, corymbose, axillary and terminal; calyx five-toothed, cup-shaped; petals five, elongate-linear, pubescent, imbricated; disk thick, erect, columnar; stamens five, inserted at the base of the torus. July. *l.* alternate, petiolate, trifoliolate; leaflets gland-dotted, acuminate, entire, glaucous beneath. *h.* 6ft. Brazil, 1823.

**SPIRANTHERA** (of Hooker). A synonym of *Pro-naya* (which see).

**SPIRANTHES** (from *speiros*, a spiral, and *anthes*, a flower; alluding to the spiral inflorescence). *Lady's Tresees.* **SYNS.** *Aristotelea* (of Loureiro), *Cyclopogon*, *Gyrostachys*, *Ibidium*. Including *Sarcoglossis*, *Sauroglossum*, and *Stenorhynchus*. **ORD.** *Orchideæ*. A large genus (about eighty species) of stove, greenhouse, or hardy, terrestrial orchide, broadly dispersed over temperate and tropical regions. Flowers small or rather large, in unilateral or dense, sessile spikes; dorsal sepals and petals erect, connivent or slightly coherent in an upper lip or hood, or the ends alone spreading; lateral sepals free and more spreading, all nearly equal; lip sessile or distinctly clawed, often embracing the terete column by its broad base, spreading at apex, undivided or three-lobed. Leaves variable. Stem leafy, or leafless when flowering. Root-fibres often fascicled on a short rhizome, sometimes thickened into a tuber. The cultivated species are here described. Except where otherwise indicated, stove treatment is necessary. The hardy species thrive in turfy loam, amongst which pieces of chalk or limestone should be mixed; the stove and greenhouse ones succeed in well-drained pots filled with a mixture of turfy loam and fibrous peat, and during the season of rest these latter should be kept rather dry. Propagation is effected by carefully dividing the rootstocks of old plants, just before growth commences.

**S. æstivalis** (summer). *fl.* and bracts as in *S. autumnalis*, but rather larger; spike slightly pubescent, slender, many-flowered. July and August. *l.* 2 in. to 6 in. long, narrowed below; lower ones on the flowering stem linear, resembling the radical leaves. Stem 6 in. to 18 in. high, glabrous. Western Europe (Britain). Hardy. (Sy. En. B. 1473.)

**S. australis** (Southern). *fl.* generally pink, with a white lip, sessile; lateral sepals obscurely dilated at base, but not saccate; the broad base of the lip quite sessile, or sometimes appearing raised on a very short claw, with a tubercle on each side; spike spiral, very dense or rather loose. June. *l.*, lower ones linear or narrow-lanceolate, ½ in. to 4 in. long; upper ones reduced to scales. Stem 6 in. to 12 in. or more high. Australia, New Zealand, tropical and temperate Asia, extending to some parts of Europe. 1823. Greenhouse. **SYN.** *Neottia australis*.

**S. autumnalis** (autumnal). *fl.* white, fragrant, sheathed by the cucullate, cuspidate bracts; lip channelled at the base, the tip exserted, crenate; spike slender. August and September. *l.* 1 in. long, in lateral rosettes, ovate, acute, appearing after the flowers. Stem 4 in. to 8 in. high; upper part and inflorescence pubescent. Europe (Britain), &c. Hardy. (Sy. En. B. 1472.)

**S. bicolor** (two-coloured). *fl.* greenish, with a white lip; sepals gibbous below the lip; lip complicated, keeled on the back, cucullate at the dilated base; spike loose, spiral, 2 in. to 4 in. long, densely glandular-pubescent. January. *l.*, lowest rosulate, oblong-lanceolate, acuminate, disappearing before flowering. Stem distantly sheathed with minute leaves. *h.* 1ft. Trinidad, 1823. (B. R. 794, under name of *Neottia bicolor*.)

**S. bracteosa** (bracteate). *fl.* white and yellow; lateral sepals connate at base; middle lobe of lip three-lobed; bracts linear-lanceolate, leafy, longer than the flowers; spike rarely straight. May. *l.* rosulate, oblong, acute. *h.* 1ft. Brazil, 1835. (B. R. 1934.)

**S. cernua** (drooping). *fl.* pure white, sweet-scented, pubescent or nearly smooth; lip oblong and very obtuse when outspread (when not so, concuplicate, or the margins much incurved), the callosities at the base prominent; spike cylindrical, rather dense, 2 in. to 5 in. long. September and October. *l.* linear-lanceolate, the lowest elongated, 4 in. to 12 in. long. Stem leafy below, 6 in. to 20 in. high. North America, 1796. Hardy. (B. M. 5277; B. R. 823.) **SYN.** *Neottia cernua* (B. M. 1568; S. B. F. G. 42).

**S. cinnabarina** (cinnabar-coloured). \* *fl.* yellowish-flesh-coloured, urceolate, slightly tomentose; segments yellowish within, approximating, reflexed at apex; lip whole-coloured; bracts coloured, acute; spike conical, thyrsoid, spirally twisted. June. *l.* lanceolate, sheathing, acute. Stem cylindrical, pale reddish, 2ft. to 3ft. high. Mexico, 1846. **SYN.** *Stenorhynchus cinnabarinus* (B. R. 1847, 65).

**S. colorans** (coloured). \* *fl.* scarlet, glabrous, ½ in. long, approximate; lip oblong-linear, shortly acuminate; bracts oblong-lanceolate, acuminate, as long as the flowers; spike 2 in. to 3 in. long. April. *l.* elliptic or elliptic-oblong, acute, 4 in. to 6 in. long. *h.* 2ft. West Indies and Mexico to Venezuela, 1790. **SYNS.** *Neottia speciosa* (A. B. R. i. 3; B. M. 1374; H. E. F. 3, 4; L. B. C. 838), *Stenorhynchus speciosus*.

**S. c. maculata** (spotted). *l.* variegated with bright green spots on a darker ground, 1883.

**S. o. Ortgiesii** (Ortgies's). *fl.* rose-coloured. *l.* marked with large white blotches. 1873.

**Spiranthes—continued.**

**S. elata** (tall). *fl.* greenish,  $\frac{1}{2}$  in. long; lip linear, blunt, entire; spike elongated, spiral, pubescent,  $\frac{3}{4}$  in. to 8 in. long; scape glabrous, sheathed with clasping-tubular, acuminate scales. July. *l.* rosulate, elliptic or elliptic-oblong, acute, petiolate, 2 in. to 6 in. long. *h.*  $\frac{1}{2}$  ft. to 2 ft. West Indies, 1790. *SYNS.* *Neottia elata* (B. M. 2026; L. B. C. 343), *N. minor* (A. B. R. 376).

**S. e. Lindleyana** (Lindley's). *fl.* greenish-white, sub-sessile, in pairs, turned to one side; lip dilated, and turned down at the apex with lateral, recurved margins. February. *l.* variegated. Caracaea. This resembles *S. bicolor* and *S. cernua*; from the former it may be distinguished by its much shorter leaves and scape, and from the latter by its broader leaves and blunt lip.

**S. Esmeralda** (Esmeralda). *fl.* greenish-white, finally yellowish; outer perigone oblique, with glandular hairs outside the sepals; upper sepal ligulate, acute, the lateral ones nearly equal; petals lanceolate, acute, unequal-sided; lip oblong, pandurate or ovate, acute, with two conical, retrorse calli at base; spike spiral, elongated, many-flowered, glandular-hairy; scape above  $\frac{1}{2}$  ft. high, with many sheaths. *l.* rosulate, cuneate-oblong, acute, dark green, blotched with white. Brazil, 1862. (Ref. B. 121.) *SYN.* *S. margaritifera*.

**S. euphlebica** (veined). *fl.* not numerous, but crowded, horizontal, shortly pedicellate; perianth white, with red and brown veins on the free portions of the sepals and petals, pubescent externally; sepals united in a tube  $\frac{1}{2}$  in. long; petals semi-lanceolate, erect; scape light greenish-brown. November. *l.* all radical,  $\frac{5}{8}$  in. to 6 in. long,  $\frac{1}{4}$  in. to 2 in. broad, linear or obovate-oblong. *h.* 1 ft. to 1  $\frac{1}{2}$  ft. Brazil, 1882. (B. M. 6690.)

**S. grandiflora** (large-flowered). A synonym of *S. picta grandiflora*.

**S. margaritifera** (pearl-bearing). A synonym of *S. Esmeralda*.

**S. orchoides** (Orchis-like). *fl.* lurid, puberulous; sac produced beyond the adnate portion into a bluntly conical, free spur, one-half the length of the ovary; lip oblong, pointed; spike  $\frac{5}{8}$  in. to 5 in. long. November. *l.* late in appearing, long, broadly lanceolate, pointed. *h.* 2 ft. to 3 ft. West Indies and Mexico to Brazil, 1826. *SYN.* *Neottia orchoides* (B. M. 1036; B. R. 701).

**S. picta** (painted). *fl.* greenish-white or variegated, eight to ten lines long, distant; sepals and petals linear-oblong, the lateral sepals decurrent; lip included, oblong, channelled below the veiny summit, dilated at base; spike  $\frac{4}{8}$  in. to 6 in. long, hairy; scape glabrous below, sheathed with acuminate scales. February. *l.* coetaneous, lanceolate or elliptic-oblong,  $\frac{4}{8}$  in. to 6 in. long, tapering into the petioles. *h.* 1 ft. to 2 ft. West Indies, &c., 1843. (B. R. 823, under name of *S. cernua*.)

**S. p. grandiflora** (large-flowered). *fl.*, sepals, petals, and lip greenish within. *l.* almost unspotted. Brazil, Guiana. *SYNS.* *S. grandiflora* (B. R. 1043), *Neottia grandiflora* (B. M. 2730).

**S. p. variegata** (variegated). *fl.*, sepals, petals, and lip white within. *l.* variegated. *SYNS.* *Neottia acutis* (S. E. B. 105), *N. picta* (B. M. 1562; L. B. C. 214).

**S. Romanzoviana** (Count Romanzov's). *fl.* white, much larger and broader than in *S. festalis*; lip tongue-shaped, contracted below the recurved tip, the tubercles at the base smooth and shining; spike 2 in. to  $\frac{3}{4}$  in. long, stout, glandular-pubescent. August and September. *l.*, radical ones on the flowering stem narrow obovate-lanceolate,  $\frac{3}{8}$  in. to 6 in. long. Stem from 6 in. to 10 in. high, leafy throughout. Europe (Britain), &c. Hardy. (G. C. n. s., xvi. p. 465; Sy. En. B. 1474, under name of *S. gemmipara*.)

**S. Sauroglossum** (lizard-tongued). *fl.*, sepals green, broader towards the apex; upper petal agglutinate, the lateral ones arcuate; lip white, parallel with the column, linear, channelled, sessile; bracts subulate; raceme 1 ft. or more long, dense, cylindrical; scape nearly 2 ft. long, sheathed with distant, leafy scales. April. *l.* radical, oblong-lanceolate, sub-erect, fleshy, not plicate, one-third the length of the scape. Brazil, 1832. *SYN.* *Sauroglossum elatum* (B. R. 1618). As the genus *Sauroglossum* is merged into *Spiranthes*, and the old specific name of plant here described was not occupied, it has been necessary to give a new specific name.

**S. Smithii** (Smith's). *fl.*, in one variety, yellow, the lip marked with a few green veins; in another, brownish, having a yellowish lip striped with green; peduncle many-flowered. Costa Rica, 1868. This plant is allied to *S. picta*.

**S. Weirii** (Weir's). *fl.* reddish; raceme elongated, furnished with white, cuspidate bracts. *l.* petiolate, oblong, acute, above dark purple, freely spotted with cream-colour, below purplish. New Grenada, 1870.

**SPIRE LILY.** A common name for *Galtonia canadensis*.

**SPIROCONUS.** A synonym of *Trichodesma* (which see).

**SPIRONEMA** (from *speira*, spiral, and *nema*, a filament; alluding to the spirally-twisted bundles of vessels contained in the filaments). *ORD.* *Commelinaceae*. A monotypic genus. The species is a robust, creeping or stolon-

**Spironema—continued.**

ferous, stove, perennial herb, more ornious than beautiful. It thrives in any light, rich soil, and may be increased by divisions.

**S. fragrans** (fragrant). *fl.* white, small, fragrant, in dense, head-like cymes, sub-sessile or very shortly pedicellate, forming a tall, rigid, few-branched panicle; sepals and petals sub-equal, distinct; stamens six, all perfect. May. *l.* large, oblong-lanceolate, sessile, in slightly-imbriated sheaths. Stem leafy, short, thick. *h.* 2 ft. Mexico, 1839. (B. R. 1840, 47.)

**SPIROSTEMON.** A synonym of *Parsonsia* (which see).

**SPITHAMÆUS.** A span long. See *Span*.

**SPLEENWORT.** See *Asplenium*.

**SPLICE - GRAFTING.** Another name for whip or tongue-grafting, the best method of grafting, and one by which plants are very extensively propagated. For details of application, see *Grafting*.

**SPODO.** This term, used in Greek compounds, signifies ash-grey.

**SPONDIAS** (an old Greek name, used by Theophrastus for the plum, which the fruit of this genus much resembles). Hog Plum; Otaheite Apple. Including *Poupartia*. *ORD.* *Anacardiaceae*. A genus comprising about eight species of stove trees, scattered over the tropics. Flowers small, shortly pedicellate; calyx small, deciduous, four or five-cleft; petals four or five, spreading, sub-valvate. Drupes fleshy. Leaves often clustered near the apices of the branchlets, alternate, impari-pinnate; leaflets opposite, often long-acuminate. A selection of the introduced species is given below. They thrive in a compost of loam and sand. Large cuttings will root in sand or mould, in heat.

**S. borbonica** (Bourbon). *fl.* dark-purple, in axillary and terminal, compound racemes. *l.* with numerous entire, acuminate leaflets. *h.* 40 ft. Bourbon and Mauritius, 1825.

**S. dulcis** (sweet). Sweet Otaheite Apple. *fl.* yellowish-green, in a divaricate panicle. June. *fr.* golden-yellow, with somewhat the flavour of pine-apple. *l.*, leaflets elliptic-oblong, acuminate, repandly crenulated, smooth, with parallel veins. *h.* 50 ft. Society Islands, 1793.

**S. lutea** (yellow). Golden Apple; Jamaica Plum. *fl.* yellowish-white; racemes panicle, often exceeding the leaves. Summer. *fr.* yellow, ovoid, 2 in. long, with an agreeable, acid, aromatic flavour. *l.*, leaflets three to eight-jugate, petiolulate, ovate-lanceolate or lanceolate, acuminate, sub-entire or serrulated. *h.* 30 ft. West Indies, 1793.

**S. purpurea** (purple). *fl.* purplish; racemes lateral, simple, few-flowered, much shorter than the leaves. Summer. *fr.* yellow, or tinged with purple. *l.*, leaflets eight to ten-jugate, shortly petiolulate, elliptic-oblong, somewhat blunt, usually serrated. *h.* 30 ft. West Indies, 1817.

**SPONDYLOCOCCA.** A synonym of *Callicarpa*.

**SPONGELET** and **SPONGIOLE** (diminutives of *Sponge*). Terms formerly much in use to denote the tips of young rootlets, under the mistaken supposition that they absorbed the plant's food from the soil like a sponge. The formation of new cells in roots goes on (in monocotyledonous plants almost entirely, and in Dicotyledons to effect increase in length) very near the tip, behind the protecting layer, known as the root-cap or *pileorrhiza*. The newly-formed cells are very small; and are so closely packed with protoplasm, as to appear very different from the cells in the older part of the root. The latter cells are larger, and more translucent, containing less protoplasm in proportion to their size. The small size of the cells in the tips of the roots, and their abundant contents, rendered it difficult, with the microscopes formerly in use, to make out the structure of this part. It was supposed that they formed a body like a sponge in its power of sucking in fluid from the soil, and the name *Spongiole* was, therefore, given. It is now known that the root-hairs, and not the tips of the roots, absorb the fluid nourishment that plants take in from the soil. See *Sap*.

**SPONGE-TREE.** A name applied to *Acacia Farnesiana*.

**SPOONFLOWER.** See *Labisia*.

**SPOONWORT.** A popular name for *Cochlearia*.

**SPORADIC.** Widely dispersed or scattered.

**SPORANGIUM and SPORANGE** (from *spora*, seed, and *ageion*, a vessel; the latter word is sounded as if spelt *angeion*). Terms used to denote the small vessels or cases in which the spores of Ferns are produced, on the backs of the fronds, in the familiar, little, dark masses called sori. The Sporangia may be exposed on the surface of the fronds from their origin (e.g., in Polypodies), but are usually protected, more or less completely, under a membrane or indusium. Each Sporangium is supported on a rather slender stalk in most Ferns; but in a few they are attached without a stalk. In the Tribe *Marattiæ* they may be partly joined to one another, and among *Ophioglossæ* they are sunk in the substance of the modified fertile frond. In most Ferns, they are formed of a single layer of cells, which are thin-walled, with the exception of a single row of thicker-walled cells, known as the annulus, which runs over the top of the Sporangium, or around it horizontally, or forms a cap on the top. Whatever its position, the annulus, by its resistance to pressure, causes the ripe Sporangium to split in a definite place. The spores in the other Orders of Vascular Cryptogams also are contained in Sporangia; and the same term is employed for corresponding structures among the Cellular Cryptogams; but for the peculiarities of their structure in these groups the reader must refer to works on Systematic Botany, as these peculiarities are of no special interest in gardening.

**SPORE** (from *spora*, seed). The name given to those bodies in Cryptogams that reproduce the species, and from which young plants grow. Some Spores resemble the seeds of Phanerogams, or flowering plants, in being produced sexually; but they differ in the Spore never inclosing an embryo or young plant, as the seed does. The Spore, in fact, corresponds to the embryo itself, rather than to the entire seed. But, in addition to these sexual Spores, most Cryptogams produce others asexually from single cells, by a process of budding, or of cell division. These asexual Spores may very closely resemble the sexual in appearance; but they are often very different, and frequently a plant bears two or three varied forms of asexual Spores, produced, it may be, under different conditions as regards food, temperature, and environments. They often receive special names, e.g., Conidia, Sporidia, Stylospores, Zoospores, and so forth among Fungi; and Stylospores, Tetraspores, &c., among Algae. For a fuller account of the forms assumed by Spores among Fungi, see **Mushrooms, Oidium, Peronospora, Pleospora and Puccinia**; and for a description of the life-cycle of the higher Cryptogams, and of the part played by Spores in the cycle, see **Mosses and Prothallus**.

**SPORIDIUM.** The same as, or a diminutive of, **Spore** (which see).

**SPORIFEROUS.** Spore-bearing.

**SPOROBOLUS** (from *sporos*, a seed, and *bolus*, a casting; the seeds are loose and easily scattered). **SYNS.** *Agrosticula*, *Cryptostachys*, *Triachyum*, *Vilfa*. Including *Agrostis* (in part). **ORD.** *Gramineæ*. A rather large genus (about eighty species) of greenhouse or hardy, annual or perennial grasses, of variable habit, broadly dispersed over the temperate and warmer regions of the globe, being numerous in America, and few in Europe and Russian Asia. Spikelets small, one, or rarely two, flowered; glumes three, membranous; panicle spike-formed or sometimes elongated and very slender. Leaves flat or

**Sporobolus—continued.**

convolute-terete. A few of the species have been introduced, but none are of much value from a garden standpoint.

**SPORT.** A bud-variation or seed-variation.

**SPRAGUEA** (named in honour of Isaac Sprague, an American botanical draughtsman). **ORD.** *Portulacææ*. A monotypic genus. The species is a half-hardy, dwarf perennial herb, of novel character. It is well adapted for planting on the rockwork, or in the edges of flower borders; any ordinary soil will prove suitable. Propagated by cuttings; or by seeds, sown in a cold frame, in spring.

**S. umbellata** (umbelless). *fl.* densely imbricate-spicate; sepals two, whitish, persistent, large, scarious; petals four, rosy-lake, just protruding; anthers purple; umbel terminal, compound, many-rayed. July. *l.* radical ones rosulate, spatulate, slightly fleshy; cauline ones smaller, alternate. California, 1853. (B. M. 5143.)

**SPRAY.** A floral head-dress, worn on the side of the head, either composed of various flowers or of one branch or shoot, when specially suited for the purpose. The water from a syringe, when broken into very fine particles, is often called Spray.

**SPREAD EAGLE.** A common name for *Oncidium carthaginense*.

**SPREKELIA** (so called after J. H. Sprekelsen, of Hamburg, who wrote on liliaceous plants, and died in 1764; from him Linnæus received *S. formosissima*). **ORD.** *Amaryllidææ*. A genus of two species of greenhouse or half-hardy, tunicated-bulbous plants, requiring culture similar to *Amaryllis* (which see).

**S. Cybister** (Cybister). Tumbler *Sprekelia*. *fl.* reflexed; perianth red below, somewhat greenish above, the segments broad below, pale-striped within, long-narrowed above; filaments very long, reddish towards the base; peduncles above lin. long; scape strong, sub-terete, upwards of 2ft. high, sanguineous below, four-flowered. April. *l.* appearing after the flowers, lin. broad, reddish in the centre towards the base. Bolivia, 1840. A very remarkable plant. (B. M. 3872.)

**S. formosissima** (very beautiful).\* *Jacoea* Lily. *fl.* crimson or white, large and showy, pedicellate, in a spathe-like bract; perianth very declinate, without any tube, the segments scarcely unequal; stamens affixed at the base of the segments; scape fistular. June. *l.* late in appearing, loriform-linear. *h.* 2ft. Mexico, 1658. (S. B. F. G. ser. ii. 144.) **SYNS.** *S. glauca* (B. R. 1841, 16), *Amaryllis formosissima* (B. M. 47).

**S. glauca** (glaucous). A synonym of *S. formosissima*.

**SPRENGELIA** (named in honour of Christian Conrad Sprengel, of Brandenburg, 1750-1816, who published, in 1793, a celebrated work on the fertilisation of flowers). **SYNS.** *Poiretia* (of Cavanilles), *Ponceletia*. **ORD.** *Epicridææ*. A small genus (three species) of elegant little, erect or prostrate, glabrous, greenhouse shrubs, confined to extra-tropical East and South Australia. Flowers solitary and terminal, many-bracted; calyx of five sepals; corolla as long as, or scarcely exceeding, the calyx; lobes five, spreading, imbricated; stamens short, hypogynous. "Leaves with a shortly sheathing, often membranous base, completely covering the branches, very concave and stem-clasping immediately above the base, acute or acuminate, with a spreading point, finely veined or almost veinless, the upper ones passing into floral leaves or bracts, the sheathing bases of the stem leaves deciduous with them, leaving the denuded stem without scars" (Bentham). Two of the species have been introduced. These are best raised from seeds when they can be obtained, and grown on in firmly pressed, well-drained pots of sandy peat. Cuttings should be treated like those of *Epicris*.

**S. Andersoni** (Anderson's). A synonym of *Andersonia sprengeloides*.

**S. incarnata** (fleshy).\* *fl.* pink; sepals coloured; corolla equalling the calyx, the petals almost free, the very short claws valvate and slightly cohering. May. *l.* lin. to 1in. long, tapering to a spreading or recurved point; floral ones similar, but smaller. *h.* 2ft. 1793. (L. B. C. 262; B. M. 1719.)



**Sprengelia**—*continued*.

**S. Ponceletia** (Ponceletia).\* *f.* scarlet; sepals leaf-like, but more lanceolate; corolla about as long as the calyx, the very short tube not separating into petal claws, the lobes much longer. May. *l.* broad, concave, spreading or incurved, acuminate and pungent-pointed, two to four lines long. *h.* 1 ft. 1826. *SYN.* *Ponceletia sprengeloides*.

**SPRENGELIA** (of Schultes). A synonym of **Melania** (which *see*).

**SPRING BEDDING.** A style of bedding in which hardy plants play a conspicuous part, along with various bulbs. In late springs, it is not an unfrequent occurrence, when the same beds are to be occupied with the ordinary tender subjects for a summer display, that, just at the time for planting the latter, the spring flowers are about at their best; this must, therefore, be anticipated, if the same beds are to be used for both sets of plants, or Spring Bedding must be carried out in a separate part of the garden. Early-flowering species and varieties of *Crocus*, also Daffodils, Hyacinths, and Tulips, will be past flowering before the middle of May, the season when summer flower-beds are required; but their foliage will rarely have ripened by that time, and, consequently, if the bulbs are of material value for another season's display, it would not be advisable to disturb them. Hardy plants, for Spring Bedding, have to be prepared in a reserve garden or border, for transferring, some time during September and October, to the positions where they are intended to flower. Many that are well adapted for the purpose are only of annual duration, and these should be raised from seeds, sown in the reserve ground, not later than about the middle of July, the young plants being transplanted and grown on afterwards.

Amongst hardy annuals, used for Spring Bedding, *Silene pendula*, and its variety *compacta*, are indispensable. Other valuable plants for the purpose, mostly perennials, are the following; they are generally of very easy culture: *Alyssum saxatile*; *Antennaria tomentosa*, suitable for an edging; *Arabis albida*; *Aubrietia*, in variety; Daisy, several double forms; *Iberis*, perennial species; *Myosotis dissitiflora*, and other species of Forget-me-not; *Phlox*, dwarf forms or varieties of *P. subulata*, &c.; *Polyanthus* and hardy Primroses, in great variety; *Pyrethrum* (Golden Feather); hardy *Sempervivum*; early-flowering Violas and Wallflowers. In the last-named, the chief colours represented are blood-red and golden-yellow.

**SPRING-BEETLES.** A name given to the insects that produce the dreaded **Wireworms** (which *see*). The name is derived from the power possessed by these beetles (*Elateridæ*), when laid on their backs on a hard surface, of leaping a few inches into the air. This power is due to a peculiar mechanism on the back between the thorax and abdomen. It enables the insects to turn over, which they would not otherwise do, because of the shortness of their legs. This habit has also gained for them the popular names of Skipjacks and Snap Beetles.

**SPRING BELL.** A common name for **Sisyrinchium grandiflorum** (which *see*).

**SPRING GRASS.** A common name for **Anthoxanthum** (which *see*).

**SPRINGIA.** A synonym of **Ichnocarpus** (which *see*).

**SPRING SNOWFLAKE.** A common name for **Leucojum vernum** (which *see*).

**SPRING USHER MOTH.** *See* **Hybernia**.

**SPRING-WEEVILS.** A group of Weevils which possess powerful thighs, especially in the last pair of legs, and are thus able to leap several inches. *See* **Orchestes**.

**SPRUCE FIR.** A term applied to *Dacrydium cupressinum*, several species of *Picea*, &c.

**SPRUCE-GALL APHIS** (*Chermes Abietis*). The maker of curious galls on the young twigs of Spruce-trees, especially in crowded plantations. In such situations, Spruces are often loaded with the galls of this insect. They resemble young cones or miniature pine-apples, whence they are often called Spruce Pine-apple Galls. When situated at the tips of young branches, they are usually quite regular in form; but when the base of the twig is affected, the Gall, though generally larger than when near the tip, is often confined to one side of the twig, which becomes much swollen, while the other side remains stunted. When full-grown, the Galls vary from  $\frac{3}{4}$  in. to 1 in. in length, by about two-thirds as much in breadth, and consist of the swollen, overlapping bases of the leaves of the twig, which assume the appearance of scales, frequently prolonged into short, green tips. The galls are often red, but may be yellowish or pale green, according to exposure to, or absence of, light. While fresh, they are fleshy in texture; but, after a time, the scales gape apart, exposing numerous cavities between their bases, and become woody and brown. In this condition they frequently remain for months, or even for years, on the trees, the branches of which are often loaded with such dry galls, the growth of several previous years.

The gall-makers are Aphides, belonging to the genus *Chermes*, distinguished from most of the Aphides by the short, stout antennæ, the absence of honey-tubes, and the simple, unbranched veins in the fore wings. The species is *C. Abietis*, sometimes known also as *Adelges Abietis*. The insects vary a good deal, according to their stage of development and their sex. The originators of the galls are wingless, viviparous females, which are very small, ochreous-yellow (with green or purple shades and green legs), woolly, and oval. These females hibernate on the branches; and in spring each fixes herself near the base of a bud when it begins to grow, and, pushing in her beak, she thus at the same time obtains her own food, and, by the irritation she causes, gives rise to the swelling of the young leaves that form the gall. Between the swollen leaves are cavities, in one of which she is sheltered; and here she lays numerous eggs, which are covered with the woolly coating of her body. The larvæ soon emerge from the eggs. They spread over the gall, and, by the irritation their suction causes, increase the size of the gall, the scale-leaves overlapping and covering them, in the opinion of some observers; whilst others believe that the larvæ creep, through minute slits, into pre-existing cavities between the scales. In the cavities they become pupæ, and about June and July winged females are numerous. These are much larger than the wingless females, and are yellowish-green or golden-brown, with short, green legs, and horizontally-folded, broad wings. The males are very rare; they are very small, and wingless. The winged females soon scatter themselves over the trees, and lay eggs, from which, in due time, the wingless females are again developed.

**Remedies.** The best, where applicable, is to pick off and destroy the galls while young, before the insects have spread from them over the plants. Badly-infested trees or branches should be burned without delay. The galls should not merely be thrown on the ground, as they contain enough sap to permit of the insects coming to maturity in them after their removal from the trees. Overcrowding, deficiency of air and light, and bad drainage, greatly increase the risk to the trees of injury from these galls; hence, judicious thinning, draining damp soils, and, in fact, whatever tends to strengthen the trees, are all useful preventives of injury.

**SPRUCE PINE-APPLE GALL.** *See* **Spruce-Gall Aphis**.

**SPRUE.** A market name for the smallest sprouts of *Asparagus*.

**SPUMESCENT, SPUMOSE.** Froth-like in appearance.

**SPUR.** A hollow, terete extension of some part of a flower, usually nectariferous; e.g., the calyx of Larkspur and the corolla of Violet. The term is rarely applied also to a solid, spur-like process.

**SPURGE.** See *Euphorbia*.

**SPURGE FLAX.** An old name for *Daphne Mezereum*, and other species.

**SPURGE LAUREL.** See *Daphne Laureola*.

**SPURGE NETTLE.** A common name for *Jatropha urens*.

**SPURGE OLIVE.** A popular name for *Ceanothus tricoccum* and *Daphne Mezereum*.

**SPURGEWORTS.** Lindley's name for the *Euphorbiaceæ*.

**SPURS, SLIPPER.** See *Pedilanthus*.

**SPYRIDIDIUM** (from *spyris*, a basket, and *eidōs*, resemblance; in allusion to the shape of the calyx). ORD. *Rhamnææ*. A genus comprising twenty-five species of greenhouse, Australian shrubs. Flowers sessile in heads or rarely solitary, surrounded by small, brown bracts; calyx five-lobed; petals five, hood-shaped, usually inclosing the anthers; stamens five; heads small, sessile, usually several together in a compound head or in corymbose cymes. Leaves usually small. Only one species has been introduced to gardens. It thrives in a compost of peat and sandy loam. Propagation may be effected by cuttings of the half-ripened shoots, cut to a joint, dried at the base, and inserted in sand, under a glass.

**S. globulosum** (globulose). *fl.*-heads nearly globular, numerous, in dense, corymbose cymes in the axils of the leaves, and not much exceeding them. *l.* ovate, obovate, or oblong, very obtuse, 1 in. to 1½ in., or rarely 2 in., long, glabrous above, white or hoary beneath, or rarely slightly rusty. 1874. A tall shrub. (R. G. 795.)

**SQUAMA.** A scale, usually the homologue of a leaf.

**SQUAMATAXUS.** A synonym of *Saxegothea*.

**SQUAMATE, SQUAMIFEROUS, SQUAMOSE.** Scaly; covered with small, scale-like leaves.

**SQUAMELLA, SQUAMULA.** A diminutive or secondary scale.

**SQUAMIFORM.** Scale-like.

**SQUAMULOSE.** Beset or covered with minute scales.

**SQUARROSE.** When bodies are rough with spreading and projecting processes. Imbricated scales, bracts, or leaves are said to be squarrose when their tips are pointed and very spreading or recurved.

**SQUARRULOSE.** Minutely squarrose.

**SQUASH.** A name applied to several species of *Cucurbita*.

**SQUILL.** See *Scilla*.

**SQUILLA.** Included under *Urginea* (which see).

**SQUILL, ROMAN.** A popular name for *Bellevalia*.

**SQUILL, STRIPED.** A common name for *Puschkinia scilloides*.

**SQUINANT.** An old name for *Andropogon Schœnanthus*.

**SQUIRREL-TAIL GRASS.** A popular name for several species of *Hordeum*.

**SQUIRTING CUCUMBER.** See *Echallium Elaterium*.

**STAAVIA** (named after Martin Staaf, a correspondent of Linnaeus). ORD. *Bruniaceæ*. A genus comprising about half-a-dozen species of greenhouse shrubs, resembling Heaths or Epacriees, and confined to the Cape of Good Hope. Flowers small, collected into terminal, disk-like heads, involucreted by numerous, mostly shining, whitish bracts, which are either longer or shorter than the leaves; petals free. Leaves small, erecto-patent or recurved, linear or acicular. The following is the best-known of the few species which have been grown in this country. It thrives in eandy peat, and may be propagated by cuttings of the young wood, inserted in sand, under a glass.

**S. glutinosa** (glutinous). *fl.* white, agglutinated with resinous juice; heads usually solitary, the size of a cherry; bracts of involucre whitish, greenish at base, ½ in. long, with a black mucro. April. *l.* approximate, erect or spreading, from six to eight lines long, linear, trigonal, obtuse, callous, and, as well as the branches, quite smooth. *h.* 3 ft. or more. 1793. (L. B. C. 852.)

**STACHYOPOGON.** A synonym of *Aletis*.

**STACHYS** (the ancient Greek name used by Dioscorides for this genus or for some similar plants, and derived from *stachys*, a spike; alluding to the spicate inflorescence). Hedge Nettle; Woodwort. SYNS. *Betonica*, *Eristomum*, *Galeopsis* (of Mönch), *Tetrahitum*, *Trizago*, *Zietenia*. ORD. *Labiata*. A large genus (nearly 200 species have been described, but probably not more than 160 are really distinct) of greenhouse or hardy, tall perennial or diffuse annual herbs, rarely sub-shrubs or small shrubs, broadly dispersed, but chiefly inhabiting North temperate and Oriental regions. Flowers purplish, scarlet, pale, yellow, or white, rather small or sometimes showy, sessile or very shortly pedicellate; calyx tubular-campanulate, five-toothed; corolla cylindric, with usually a ring of hairs inside, often incurved above, not, or scarcely, dilated at throat; upper lip of limb erect or spreading; lower one longer, spreading, three-lobed, the mid-lobe largest; stamens four; whorls two to many-flowered, axillary or clustered in terminal spikes. Nutslets ovoid or oblong. Leaves entire or toothed; floral ones conformed or reduced to bracts. *S. arvensis* (Field Betony), *S. Betonica*, *S. germanica*, *S. palustris* (Clown's All-heal), and *S. syriatica*, are included in the British Flora. The species, some of which have a rather weedy appearance, will thrive in any ordinary garden soil; they may be increased by seeds, or by divisions. A selection of those best known in gardens is given below; except where otherwise indicated, they are hardy, herbaceous perennials.

**S. albicaulis** (white-stemmed). *fl.*, calyx loosely ten-nerved; corolla violet, glabrous, twice as long as the calyx; whorls six-flowered, remote; racemes elongated, slightly branched. Summer. *l.* remote, 1 in. to 3 in. long, the lower ones petiolate, the upper ones sessile, all lanceolate, deeply toothed, rounded-cuneate or narrowed at base. Stem branched, 2 ft. to 3 ft. high, white-woolly at base. Chilian Andes. (B. R. 1558.)

**S. alpina** (alpine). *fl.*, calyx teeth acute, spiny; corolla purplish or fuscous-red, woolly outside, scarcely twice as long as the calyx; whorls remote, many-flowered. Summer. *l.* petiolate, ovate, obtuse or slightly acute, crenate-serrate, cordate at base, villous, scarcely wrinkled. *h.* several feet. South Europe. A very variable plant.

**S. a. intermedia** (intermediate). *l.* more wrinkled, and sometimes slightly woolly beneath. A large form. (S. B. F. G. 100, under name of *S. sibirica*.)

**S. angustifolia** (narrow-leaved). *fl.* shortly pedicellate; corolla purplish, glabrous or slightly pubescent, the tube shortly exserted; whorls remote, two-flowered; racemes over 1 ft. long, nearly simple. July. *l.* linear, entire, serrated, or the lower ones pinatifid, all acute at apex. Branches twiggly, diffuse, several feet long. *h.* 9 in. Tauria, 1823. Hardy sub-shrub. (S. B. F. G. 180.)

**S. arenaria** (sand-loving). *fl.*, calyx four lines long; corolla purplish, pilose outside, twice as long as the calyx; whorls loosely six to ten-flowered, remote; racemes loose, ascending, nearly 1 ft. long. July. *l.* sub-sessile, oblong-linear or lanceolate, 1 in. to 1½ in. long, acute, slightly serrated, long-narrowed

**Stachys**—continued.

towards the base, entire. Levant, 1804. Plant decumbent. (B. M. 1959.)

**S. aspera** (rough). *fl.* sessile or nearly so; corolla purple or rose-red, glabrous throughout; spikes usually much interrupted. Summer. *l.* oblong-ovate to oblong-lanceolate,  $\frac{1}{2}$  in. to  $\frac{4}{5}$  in. long, acute or acuminate, rather obtusely serrated, nearly all distinctly petiolate, and truncate or merely sub-cordate at base. *h.* 2 ft. to 4 ft. North America and Japan. Plant sparsely hirsute or hispidulous-pubescent. (L. B. C. 1412.)

**S. Betonica** (Betony). Bishop's-wort; Wood Betony. *fl.*, calyx lobes spinescent; corolla red-purple, hairy,  $\frac{1}{2}$  in. long, the tube exerted; whorls in an oblong, long-peduncled spike,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. June to August. *l.* petiolate, oblong-cordate, obtuse,  $\frac{1}{2}$  in. to  $\frac{4}{5}$  in. long, deeply crenate; cauline ones few, much narrower than the radical ones. Stem  $\frac{6}{8}$  in. to 2 ft. long, ascending or erect. Europe (Britain). This plant was formerly much used in medicine. (Sy. En. B. 1067.) *SYN. Betonica officinalis.*

**S. coccinea** (scarlet).\* *fl.* generally distinctly pedicellate; corolla scarlet-red, with a narrow, cylindrical tube twice or thrice as long as the calyx; spike interrupted. Summer. *l.* ovate-lanceolate with a cordate base, or oblong-deltoid, obtuse, crenate,  $\frac{1}{2}$  in. to  $\frac{2}{3}$  in. long; cauline ones slender-petiolate; floral ones sessile. *h.* 1 ft. to 2 ft. Texas to Arizona and Mexico, 1798. Greenhouse herbaceous perennial. (A. B. R. 310; B. M. 665; P. M. B. viii. 101.)

**S. densiflora** (dense-flowered). *fl.*, calyx teeth spiny; corolla flesh-coloured, twice as long as the calyx, villous outside, the tube incurved; spike dense, thick,  $\frac{1}{2}$  in. to  $\frac{2}{3}$  in. long. June. *l.* petiolate, ovate-oblong, obtuse,  $\frac{2}{3}$  in. to  $\frac{3}{4}$  in. long, crenate, wrinkled, cordate at base; lower floral ones constantly ovate and scarcely sessile. Stem erect,  $\frac{1}{2}$  ft. high, nearly simple. South Europe, 1759. Plant hairy. (B. M. 2125, under name of *Betonica incana*.) *SYN. Betonica hirsuta.*

**S. germanica** (German).\* *fl.*, calyx teeth longer than the tube; corolla pale pink, variegated with white,  $\frac{1}{2}$  in. long; whorls four to six-flowered. April to November. *l.* coarsely crenate-serrate, often cordate; radical ones  $\frac{2}{3}$  in. to  $\frac{5}{8}$  in. long, rather long-petiolate; cauline ones shortly petiolate, ovate-oblong or lanceolate. Stem 1 ft. to 3 ft. high, very stout, branched. Europe (Britain). A shaggy biennial. (B. R. 1289; F. D. 684; J. F. A. 519; Sy. En. B. 1068.)

**S. grandidentata** (large-toothed). *fl.*, calyx teeth somewhat spiny; corolla violet, glabrous, twice as long as the calyx; whorls six-flowered, remote. Summer. *l.* petiolate, oblong-lanceolate, deeply toothed, all rounded-cuneate or narrowed at base; floral ones shorter than the calyx. Stem erect, 1 ft. to 3 ft. high. Chili. (B. R. 1080.)

**S. grandiflora** (large-flowered).\* *fl.*, calyx six to seven lines long, purplish at apex, villous; corolla of a beautiful violet, twelve to fourteen lines long, glabrous; whorls many-flowered, distinct, the lower ones remote. May. *l.* petiolate, broadly ovate, obtuse, crenate, broadly cordate at base, wrinkled, villous; floral ones sessile. Stem 1 ft. high. Siberia, 1800. (B. M. 700, under name of *Betonica grandiflora*.)

**S. inflata** (inflated). *fl.* sessile; calyx  $\frac{1}{2}$  in. long, white-tomentose; corolla red, slightly silky outside, half as long again as the calyx; whorls distant, about six-flowered. July. *l.* sub-sessile, oblong, obtuse, entire, scarcely  $\frac{1}{2}$  in. long, white-tomentose or woolly on both sides. Branches elongated, clothed with slightly floccose tomentum. *h.* 1 ft. Persia, 1852. Hardy sub-shrub. (B. R. 1697.)

**S. lanata** (woolly).\* *fl.* striped; whorls many-flowered, the upper ones approximating in a spike. July. *l.* very thick and soft, oblong-elliptic, narrowed at both ends, scarcely crenulate, wrinkled. Stem 1 ft. to  $\frac{1}{2}$  ft. high, clothed (as well as the leaves and calyces) with dense wool. Tauria, 1782.

**S. Mawcana** (Mawe's).\* *fl.*, calyx  $\frac{1}{2}$  in. long, woolly; corolla pale straw-colour, with purple blotches on the lower lip,  $\frac{1}{2}$  in. long and broad; whorls collected into a narrow-oblong, leafy spike. July. *l.* spreading, about  $\frac{1}{2}$  in. long, ovate-cordate, sub-acute, deeply crenate-toothed, grey-green above; petioles of the cauline leaves longer than the blades. Branches 1 ft. or more high. Morocco, 1878. Whole plant clothed with silvery-white hairs. (B. M. 6389.)

**S. Salvia** (Salvia-like). A synonym of *Sphacele Lindleyi*.

**S. sibirica** (Siberian). A synonym of *S. albicaulis intermedia*.

**STACHYS**. This term, used in Greek compounds, denotes a spike: e.g., *Phyllostachys*, *Stachytarpheta*, *Stachyurus*.

**STACHYTARPHA**. A synonym of *Stachytarpheta* (which see).

**STACHYTARPHETA** (from *stachys*, a spike, and *tarphe*, thick; alluding to the form of the inflorescence). Bastard Vervain. *SYNS. Abena, Cymburus, Stachytarpha.* *ORD. Verbenaceæ.* A genus consisting of about forty species of pilose, villous, or glabrous, stove herbs, sub-shrubs, or shrubs, natives of tropical and sub-tropical America, one being also broadly dispersed over tropical

**Stachytarpheta**—continued.

Asia and Africa. Flowers white, blue, purple, or scarlet, solitary in the axils of the bracts, sessile or half-immersed in the rachis of the spike; calyx five-toothed; corolla tube straight or incurved, the limb of five broad, spreading, obtuse or retuse lobes, equal or variously unequal; perfect stamens two; bracts sometimes small or narrow, appressed or loose, sometimes ovate or lanceolate, imbricated; spikes terminal. Leaves opposite or alternate, toothed, often wrinkled. All the species thrive in a soil composed of sandy loam and leaf mould. The shrubs may be propagated by cuttings, inserted in sand, under a hand glass, in bottom heat; the perennials may be multiplied by divisions, and the annuals by seeds. The best species, from a garden standpoint, are described below. *S. mutabilis* is a handsome, perpetual-flowering sub-shrub, the leaves of which have been imported from South America for the purpose of adulterating tea.

**S. aristata** (awned). *fl.* rich deep blackish-purple, in a very long, terminal spike, clothed with numerous leavy bracts, tapering suddenly into a long subulation; corolla tube curved. October. *l.* opposite, ovate or rhomboid-ovate, acute, coarsely serrated, entire at base, tapering towards the base into short footstalks, wrinkled. *h.* 2 ft. South America, 1845. Sub-shrub. (B. M. 4211; F. d. S. 55.)

**S. bicolor** (two-coloured). *fl.* at first purple, gradually becoming pale greenish-blue, the throat of the long, funnel-shaped corolla remaining white; spike terminal, slender, exceeding the leaves; bracts subulate, erect. June. *l.* varying from ovate to ovate-lanceolate, acute, serrated from a little above the base. *h.* 3 ft. Brazil, 1865. Shrub. (B. M. 5538.)

**S. cayennensis** (Cayenne). *fl.* blue, sunk in furrows of the rachis; bracts linear, acuminate, bristly above; spikes slender. May. *l.* ovate, blunt or bluntish, contracted into the petioles. *h.* 3 ft. Cayenne, 1822. Shrub.

**S. crassifolia** (thick-leaved). *fl.* azure-blue; bracts hard, ovate; spikes long, slender, terete, straight, glabrous. June. *l.*  $\frac{2}{3}$  in. to  $\frac{3}{4}$  in. long, elliptic or oblong-obovate, entire at base, coriaceous, sessile, obtuse, crenate-serrate, the margins revolute, pubescent-tomentose beneath. *h.* 2 ft. Brazil, 1825. Shrub.

**S. dichotoma** (dichotomously-branched). *fl.* blue; bracts very narrow; spikes slender,  $\frac{6}{8}$  in. to 18 in. long. June. *l.*  $\frac{2}{3}$  in. to  $\frac{4}{5}$  in. long, ovate or ovate-oblong, coriaceous at base, cuneate-decurrent, acute or acuminate, deeply crenate-serrate. Branchlets tetragonal. *h.* 2 ft. South America. A dichotomously-branched sub-shrub. (B. M. 1848, under name of *S. urticifolia*.)

**S. Jamaicaensis** (Jamaica). Brazilian Tea-tree. *fl.* blue, sunk in deep excavations of the thickened rachis; bracts appressed; spikes about as thick as a goose-quill,  $\frac{6}{8}$  in. to 10 in. long. July. *l.* oval or oblong, coarsely serrated, tapering into the petioles. *h.* 2 ft. West Indies, 1714. Annual, but suffrutescent at base. (B. M. 1860.)

**S. mutabilis** (changeable).\* *fl.* crimson, at length rosy, large, sunk in furrows of the rachis; bracts lanceolate-subulate, spreading above the middle; spikes elongated, erect. All the year. *l.* ovate, contracted into the petioles, scabrous above, pubescent beneath. *h.* 3 ft. South America, 1801. Sub-shrub. (A. B. R. 435; B. M. 976; R. G. 90.)

**S. urticifolia** (Nettle-leaved). A synonym of *S. dichotoma*.

**STACHYURUS** (from *stachys*, a spike, and *oura*, a tail; in allusion to the shape of the catkins). *ORD. Ternströmiaceæ.* A genus consisting of only two species of half-hardy, glabrous shrubs or small trees, one being Japanese, the other Himalayan. Flowers small, disposed in short, lateral or axillary racemes or spikes; sepals four, closely imbricated; petals four, free, imbricated; stamens eight, free. Leaves serrated, membranous. *S. præcox* is a shrub or small tree, producing its flowers in great profusion before the leaves are unfolded. It thrives in any common garden soil, but except in the south-western counties, requires the shelter of a wall. The plant may be readily propagated by means of cuttings of the half-ripened wood, inserted in sandy soil, under a bell glass, in a greenhouse, and kept shaded until roots are formed.

**S. præcox** (precocious).\* *fl.* yellowish-green,  $\frac{1}{2}$  in. in diameter, sub-globosely campanulate, sessile or very shortly pedicellate; petals much larger than the sepals; spikes axillary,  $\frac{2}{3}$  in. to  $\frac{3}{4}$  in. long, curved, shortly pedunculate, many-flowered. March. *l.* 4 in. to 6 in. long, obovate or ovate-lanceolate, acuminate, serrulated, often oblique, thin, bright green. Branches slender, flexible. *h.* 10 ft. Japan, 1864. See Fig. 518, p. 484. (B. M. 6631; R. H. 1869, 200; S. Z. F. J. 18.)

**STACKHOUSIA** (named after John Stackhouse, 1740-1819, a British botanist, who wrote on *Algae*). The only genus of *ORD. Stackhousiæ* (which see for characters). The species best known to cultivation is described below. It thrives in ordinary soil, and may be increased by cuttings of the young shoots, inserted in sandy soil, in a cold frame.

**S. linariæfolia** (Toadflax-leaved). A synonym of *S. monogyna*.

**S. monogyna** (one-styled). *fl.* white; corolla tube three to four lines long; racemes at first dense, but often lengthening out to 4 in. or 5 in. April. *l.* linear or lanceolate, acute or obtuse, crowded, or few and distant,  $\frac{1}{2}$  in. to 1 in., or, in very luxuriant specimens, 2 in. long. Stems slender, simple or slightly branched, 1 ft. to 1  $\frac{1}{2}$  ft. high. Hardy perennial. *SYN. S. linariæfolia*.

**STACKHOUSIÆ.** A small natural order of herbs, usually forming a perennial stock, with erect, slightly branched, twiggly stems, often assuming a yellowish colour, rarely dwarf and tufted; they are almost endemic in Australia, one species extending to New Zealand, and another to the Philippine Islands. Flowers white or yellow, in terminal spikes, rarely solitary, three-bracted at base; calyx small, five-lobed or five-cleft; petals five, perigynous, with elongated claws, usually free at the base, but united upwards in a tubular corolla, with

#### Stages—continued.

made of iron, and the shelves of slate. If plants are found to get dry too frequently on slate Stages, it is an easy matter to spread a little fine ashes, spar, or shell, over the surface, beneath the pots, for retaining moisture.

Step-stages are those made so that one shelf is situated above the other, in a similar way to stairs; they are frequently preferred for the centre of a span-roofed greenhouse, or for the back part of a lean-to structure. The shelves in Step-stages are best made of battens, which may be fixed at any distance apart, according as the plants intended to be stood upon them are in medium-sized or small pots.

**STAG'S-HORN FERN.** A popular name for several species of *Platycerium*.

**STAG'S-HORN SUMACH.** A common name for *Rhus typhina* (which see).

**STAKES AND STAKING.** Stakes, in various sizes, are indispensable in gardens, both for supporting plants in pots, and also in the open ground. For the first-named purpose, those made from deal are the best; they may be purchased, ready for use, in a great



FIG. 518. FLOWERING BRANCHLET OF *STACHYURUS PRÆCOX* (see page 483).

spreading lobes; stamens five, included in the corolla tube, of very unequal lengths. Leaves alternate, narrow, entire, often somewhat fleshy; stipules none, or when present very minute. The order *Stackhousiæ* is limited to a single genus—*Stackhousia*—comprising about twenty species.

**STÆHELINA** (named after Benedict Stæhelin, 1695-1750, a Swiss botanist). *ORD. Compositæ*. A genus consisting of half-a-dozen species of hardy or half-hardy sub-shrubs, natives of the Mediterranean region. Flower-heads purplish, narrow, solitary or densely corymbose; involucre bracts in many series, acute or obtuse; receptacle flat; achenes glabrous or silky-villous. Leaves alternate, entire or sinuate-toothed, white-to mentose beneath. Two species, *S. arborescens* and *S. dubia*, have been introduced, but they are probably not now cultivated.

**STAFF-TREE.** A common name for *Celastrus* (which see).

**STAG BEETLES.** See *Lucanus cervus*.

**STAGES.** In greenhouses and other glass structures, Stages are erected on which to stand plants that are grown in pots. They are generally constructed of wood, but are much more substantial when the uprights are

variety of lengths and sizes, or cut out of ordinary laths of double thickness. Small annual growths of Hazel, which grow in great quantities from the base of established bushes, are valuable as Stakes for young plants that are being grown on; also prunings of fruit-trees, when appearances are immaterial. Strong Stakes, for fruit and ornamental trees, Raspberries, &c., are best selected from a plantation where the common Ash predominates, as this wood generally grows tolerably upright, and lasts a long time in use. Hazel, of moderate size, is also largely employed for Stakes, when required for packing, as, in a green or partially green state, it bends readily if required. Several other kinds of wood may also be selected, and made to answer their purpose, as Stakes.

The value of Staking, in connection with newly-planted trees, cannot be over-estimated, as, when properly executed, it prevents the trees from rocking about when the wind blows. When a single Stake is likely to be needed for permanently supporting a tree, it should be inserted at the time of planting; otherwise, it may very likely be driven in just where the best roots are situated, and thereby cause much injury. Plants that are likely to take care of themselves at the end of a year, are rendered safe for that period by placing three

**Stakes and Staking—continued.**

Stakes, in the shape of a triangle, round them, just clear of the roots, and tying to each near the top. A small piece of carpet, or something soft, should be put round the stem where the ties are made, for protecting the bark.

All Stakes must of necessity be sharpened more or less to a point, at the lower or larger end, in order that they may enter the ground.

**STALAGMITES.** A synonym of *Xanthochymus* (which see).

**STALK.** A common term for any kind of lengthened support on which an organ is elevated.

**STAMEN** (from *stamen*, a thread; in allusion to the slender form). One of the male organs of flowers. In the Stamens the pollen is formed and ripened, before it is set free to fall on the stigma, and, through it, to gain access to and fertilise the ovules (see **Ovule** and **Pollen**). There are usually several Stamens in a flower, and the whole assemblage of them is often called the *androcium* (from the Greek words *aner*, *andros*, a male, and *oikos*, a house). A complete Stamen is made

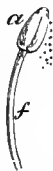


FIG. 519. STAMEN, showing (a) Anther and (f) Filament.

up of two chief parts (see Fig. 519), the anther (a) and the filament (f) or stalk supporting the anther. In many plants, the filaments are long, and cause the anthers to project from the corolla or perianth (see Fig. 520). In other plants, they are shorter than the corolla; and in some there are no filaments (e.g., in Orchids, in which the anther and the styles are adherent to one another). The filaments are usually free from one another, and are long and slender; but in many plants they are broad, or bear outgrowths (*Deutzia*), or are united into groups

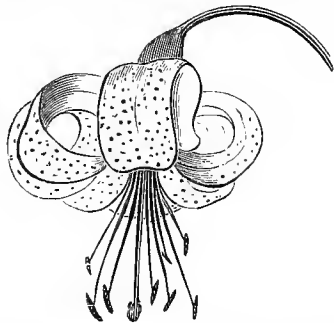


FIG. 520. FLOWER OF *LILIUM PYRENAICUM*, showing long Stamens bearing Anthers projecting beyond the Perianth.

by their base (*Hypericum*), or grow together so as to form a more or less complete tube (*Eucharis*, *Hibiscus*). The anther is usually oval or linear; and in by far the greater number of plants it is evidently made up of two lobes, separated lengthwise by a portion called the "connective," which is similar in structure to the filament, and, in many anthers, is evidently a prolongation of it. The connective is very narrow and inconspicuous in some plants; broad in others, so that the lobes are widely separated. In some it is prolonged beyond the lobes at the tip, as a plate, or backwards

**Stamen—continued.**

in spurs or outgrowths of various forms. The uses of these variations in form and position, the structure of the walls of the two pollen-spaces in each lobe, and the course of development of the pollen, are described under **Nectary**, **Pollen**, and **Pollination**. Stamens vary in number from one (*Hippuris*) to an indefinite number (*Ranunculus*); but most frequently there are three, four, or five, arranged in one circle, or six, eight, or ten, in an outer and an inner circle. On the number and arrangement of the Stamens, Linnæus founded the great divisions in the classification named after him, and for years so widely used, and which is still frequently employed, as a most convenient key for rapidly determining the names of plants.

**STAMINEAL.** Consisting of, or relating to, stamens.

**STAMINIFEROUS.** Bearing stamens.

**STAMINODE.** A rudimentary stamen.

**STAMINODY.** A name for the metamorphosis of other organs into stamens.

**STANDARD.** The fifth or posterior petal of a papilionaceous corolla.

**STANDARDS.** A term applied to trees or plants that have an upright stem supporting the head. They are grown in the open, as, for example, Apple, Pear, Plum-trees, &c., in an orchard. Chrysanthemums, Heliotrope, and Mignonette, are examples of plants readily grown as Standards in pots.

**STANGERIA** (named after William Stanger, Surveyor-General of Natal, who died in 1854). ORD. *Cycadaceæ*. A monotypic genus. The species is a stove Cycad, requiring similar treatment to that recommended for *Zamia*.

**S. paradoxa** (paradoxical). Hottentot's Head. *l.* few, long-petiolate, pinnate, highly glabrous; pinnae opposite and alternate, linear-lanceolate, obtuse, acute, or acuminate, spinulose-serulate or slightly crenate, rarely pinnatifid-lobed, traversed by parallel forked veins, like those of a *Lomaria*; the lower ones petiolulate and sometimes bifid at base, the upper ones sessile. *cones* pedunculate, villous, densely clothed with imbricating scales in many series, males cylindrical; females shorter, oblong-cylindrical. Trunk or caudex 1 ft. long, nearly subterraneous, sub-cylindrical, turnip-like, or deformed, narrowed at base. *h.* 2 ft. South-eastern sub-tropical Africa, 1851. (B. M. 512L.)

**S. p. Katzeri** (Katzer's). *l.* few, ovate; pinnae about eleven pairs, obverse-oblong, roundish and mucronate at apex, slightly undulate and crenately repand along the margins. This differs from the type in its smaller size. (R. G. 798, under name of *S. Katzeri*.)

**S. p. schizodon** (cut-toothed). *l.* pinnae irregularly incisolate. 1872. This is the more robust form; it represents the one extreme, whilst *S. p. Katzeri* represents the other.

**STANHOPEA** (named in honour of Earl Stanhope, 1781-1855, President of the Medico-botanical Society). SYN. *Ceratocylus*. ORD. *Orchideæ*. A genus including about thirty species of beautiful, stove, epiphytal orchids, natives of tropical America, from Brazil to Mexico. Flowers large, few, in a loose raceme, pedicellate; sepals and petals free, spreading, the latter sometimes undulate; lip thick and fleshy, variable and remarkable in structure; the hinder portion (hypochil) usually saccate, the middle part (mesochil) often two-horned, and the anterior portion (epichil) more or less movable; column erect or incurved; pollen masses two; bracts membranous, spathe-like; scape deflexed or pendulous. Leaf ample, plicate-veined, contracted into the petiole. Stem very short, many-sheathed, one-leaved, usually thickened below into a fleshy pseudo-bulb. Although the flowers of the Stanhopeas are ephemeral, lasting but a few days in perfection, yet their free-blossoming habit should secure their presence in all collections. Some of the flowers are very handsome, and many are very strongly perfumed.

**Stanhopea**—continued.

On account of the peculiar manner in which they are produced, the plants should be grown in baskets made even more open at the bottom and sides than is usual for other Orchids, as the racemes are pendulous, and often come out from beneath the basket. The latter should be suspended in a stove or house devoted to East Indian and Brazilian Orchids, and kept watered liberally during the period of growth. When at rest, the roots should be kept rather dry. The plants should be surrounded with fresh sphagnum, a few lumps of turfy peat, and some charcoal. The leaves should be sponged occasionally with clean water, as they are liable to be attacked by thrips and red spider. Propagation is effected by division of the old plants.

**S. aurea** (golden). A synonym of *S. Wardii aurea*.

**S. Bucephalus** (bull-horned).\* *fl.* emitting a powerful fragrance; sepals, petals, and hypochil pale rich yellow, with purple dots and small blotches everywhere except on the hypochil; hypochil boat-shaped; mesochil two-horned; epichil roundish-ovate, cuspidate; raceme deflexed, consisting of several flowers. August. *l.* stalked, oblong, acuminate, plicate. *h.* 2ft. South Mexico to Peru, 1843. A remarkably handsome Orchid. (B. M. 5278; B. R. 1845, 24.)

**S. B. guttata** (spotted). *fl.*, sepals, petals, and hypochil of a deep apricot-colour; each petal, and the hypochil, marked with four brown blotches.

**S. B. Roezlii** (Roezli's). *fl.*, sepals, petals, and base of the lip deep saffron-yellow, spotted with brown; horns and column white, the latter also dotted with purple. Nicaragua, 1874. (R. G. 785.)

**S. cirrhata** (tendrilled). *fl.* absolutely solitary; sepals white, obtuse, much longer than the ovate, yellow petals; lateral horns of the yellow and violet lip produced from the hypochil, which is three-ribbed within, and rounded outside; mesochil wanting; epichil ovate, undivided; bracts spathe-like, imbricated, longer than the ovaries; column wingless, extended into a pair of feelers, as in some *Odontoglossa*. *h.* 1ft. Nicaragua, 1840. (G. C. 1850, p. 295; L. & P. F. G. i. p. 31, 19.)

**S. deltoidea** (deltoid). *fl.* of a palish yellow, dotted over with crimson specks, large; lip orange-coloured, blackish-brown at the base, and marked on each side with a reddish-brown spot. Peru (?), 1862.

**S. Devoniensis** (Duke of Devonshire's). *fl.* pale creamy-yellow, thickly and irregularly spotted with deep crimson-purple, sweetly scented; dorsal sepal and petals barred near the base; lip whitish, purple-spotted; hypochil sub-globose, with a deep purple stain over the lower half; mesochil short, two-horned; epichil obtusely angled, rhomboid, obsoletely three-toothed at the end; peduncle bearing two flowers. July and August. *l.* shortly petiolate, lanceolate, plicate, pale green. Pseudo-bulbs ovate, ribbed. *h.* 1½ft. Guatemala, 1853. (F. d. S. 974; L. S. O. 1.)

**S. eburnea** (ivory-like). *fl.* white, fragrant; lip oblong, twice as long as the petals; hypochil and mesochil dull purple, or spotted with purple on the upper side, the latter solid, changing, truncate; epichil ovate; column very long; bracts shorter than the ovary; scape lax, pendulous. June. Venezuela, Guiana, and Brazil, 1828. (B. M. 3359; B. R. 1529.)

**S. e. spectabilis** (remarkable). *fl.* pale straw-coloured, powerfully scented; sepals broad; petals narrow; lip white, varnished, unmarked, except a pair of crimson lines, and a few small crimson dots at the base. Venezuela, 1868. (I. H. 551.)

**S. ecorruta** (hornless). *fl.* in pairs, about 4½in. across; hypochil somewhat slipper-shaped, extremely fleshy, bright orange, passing into pure white towards the point, handsomely purple-blotched on its sides, hornless, but having four little tumours; the rest of the flower pure white, except a few purple spots near the base of the firm, concave petals; bracts shorter than the ovary; scape short, pendulous. Central America, 1854. According to Dr. Lindley, this "may be regarded as a species with the hypochil (or lower half of the lip) alone present." (B. M. 4885; L. & P. F. G. i. 31; F. d. S. 181 and R. X. O. i. 43, under name of *Stanhopeastrum ecorrutum*.)

**S. florida** (flowery). *fl.* white, large; sepals and petals marked on the inside with small, purple spots; lip covered with small, purple dots, and having a large blotch on each side between the

**Stanhopea**—continued.

two keels. Mexico (?), 1880. (G. C. xvi. pp. 561, 565; R. G. ii. 39.)

**S. gibbosa** (gibbous). *fl.* dull yellow, blotched and barred with dull crimson, the colouring becoming darker on the sepals, about 6in. in diameter; hypochil incurved, keeled on each side; mesochil furnished with ligulate-falcate horns; epichil oblong, acute. June and July. Central America, 1870. A fine species, somewhat resembling *S. Wardii*.

**S. grandiflora** (large-flowered).\* *fl.* pure white, except a few crimson dots on the middle and basal parts of the lip, fully 6in. in diameter when expanded, very fragrant; hypochil roundish, two-horned in front; mesochil solid, truncate, hornless, but obsoletely three-toothed; epichil ovate; column very long; scape short, pendent. *l.* broadly lanceolate, plicate. Pseudo-bulbs ovate, furrowed. Trinidad, 1824. SYN. *Ceratophilus grandiflorus* (B. iv. 176).

**S. graveolens** (strong-smelling). *fl.* having an extremely powerful and disagreeable odour; sepals and petals delicate straw-colour; lip at the base, and the central parts of the flower generally, of a rich, deep apricot-yellow, while the horns and upper end of the lip are like ivory turning yellow; column very broad, winged to near the base, so as to have almost the form of a parallelogram; bracts narrow, scarcely equalling the ovary; spike expanded. Guatemala (?), 1843.

**S. g. aurita** (eared). A variety with flowers wholly of a deep apricot-colour.

**S. guttulata** (slightly spotted). A synonym of *S. oculata*.

**S. inodora** (scentless). *fl.* pale straw-colour, with the short, sacate hypochil alone yellow, scentless; mesochil two-horned, two-toothed, deeply sulcate between the teeth; epichil somewhat rounded-ovate, entire, longer than the incurved horns; wings of the column gradually narrowing downwards until they entirely disappear; bracts broadly oblong, equalling the ovary; spike contracted. May. Mexico, 1844. (B. R. 1845, 65; R. X. O. 165.)

**S. i. amœna** (pleasing). *fl.*, hypochil deep yellow, with brownish-red eyes; epichil rose-coloured, dotted; horns dotted inside, much acuminate.

**S. insignis** (remarkable).\* *fl.* of a pale dull yellow, richly spotted and stained with purple, large, showy, fragrant; hypochil globose, split in front; mesochil bearing falcate, incurved horns; epichil roundish-ovate, entire, shorter than the horns; column remarkable for its broadly-winged margin, which gives it almost the shape of a battledore; spike drooping, three or four-flowered. August and September. *l.* broadly lanceolate, dark green, plaited. Pseudo-bulbs clustered, ovate, furrowed. Brazil, 1826. A very handsome species, the type of the genus. (B. M. 2948-9; B. R. 1837; L. B. C. 1985; R. X. O. 164.)

**S. i. flava** (yellow). *fl.* wholly yellowish, very sweet-scented.

**S. macrochila** (large-lipped). *fl.* white or cream-coloured, marked with crimson spots disposed in lines. Mexico, 1859. (I. H. vi. p. 71.)

**S. Martiana** (Martius). *fl.*, sepals pale straw-coloured, with a few small, viciuous spots; petals white, larger-spotted, and with a broad blotch of crimson at base; lip white; hypochil short, sessile, scrotiform; mesochil short, with nearly straight, cirrhose horns; epichil oblong-linear, obscurely three-toothed; column pubescent, the margins scarcely dilated; peduncles two-flowered. Autumn. *l.* lanceolate, plicately veined. Pseudo-bulbs ovate, furrowed. Mexico, 1843. A magnificent and distinct species. (F. d. S. 2112-3; B. R. 1843, 44, under name of *S. M. bicolor*.) SYN. *S. velata*.



FIG. 521. STANHOPEA OCULATA, showing Habit and detached Flower.



**Stanhoea**—continued.

**S. oculata** (eyed).\* *fl.* usually lemon-coloured, with a large number of lilac spots on the sepals, a smaller number on the petals, a deep yellow eye, and two, or occasionally four, large, dark brown spots on the side of the hypocyl, which is very much lengthened out, as if unguiculate; horns semi-terete, ascending, acute; peduncle bearing a drooping raceme of about six flowers. July to November. *l.* large, broadly lanceolate, nerved. Pseudo-bulbs small. Mexico, 1829. A free-flowering and very showy species. See Fig. 521. (B. M. 5300; B. R. 1800.) *SYNS.* *S. guttulata*, *Ceratophylus oculatus* (L. B. C. 1764). Numerous varieties of this species occur in gardens, varying in colour and in the spotting of the lip. Most of them are sweet-scented.

**S. o. Barkeriana** (Barker's). See **S. o. Lindleyi**.

**S. o. crocea** (saffron-yellow). A synonym of *S. ornatissima*.

**S. o. Lindleyi** (Lindley's). *fl.* of a dull wine-red, but little spotted. *S. o. Barkeriana* is probably the same as this.

**S. ornatissima** (very ornate). *fl.* of a deep orange-colour, spotted with red, and marked towards the base with large blotches of reddish-brown; spikes drooping, six to seven-flowered. *l.* plaited. Peru (?) 1862. (I. H. 325; R. G. 189, under name of *S. oculata crocea*.)

**S. platyceras** (broad-horned). *fl.* nankeen-yellow, marked with purplish dots and circles of small points, large; hypocyl marked on each side with one large, brownish-purple spot. New Grenada, 1868. This plant is closely related to *S. grandiflora*. (Ref. B. 108.)

**S. pulla** (blackish). *fl.* apricot-yellow, small; lateral sepals oblong, acute, reflexed, the upper one narrower; petals very bright yellow, shorter, narrower, ligulate, acute; very bright yellow; lip very bright, shining, like a plump shoe with a roundish knob at its top and with sharp, semi-oblong side borders; inside stands a nearly square body with four keels, converging like the letter v; between this and the apical knob is an inconspicuous, transverse slit; knob white; the side borders and v-like keels brownish-purple; peduncle short, strong, two-flowered. Pseudo-bulbs short, conical, ribbed, dark. Costa Rica, 1877. (R. X. O. 205.)

**S. quadricornis** (four-horned). *fl.* pale yellow, sparingly spotted with crimson; hypocyl oblong, having two prominent horns standing erect on the lower edge of the cavity; mesochil two-horned, fleshy, excavated; epichil ovate, entire, shorter than the terete, incurved horns; bracts very short, narrow. Central America. (B. R. 1838, 5.)

**S. radiosa** (rayed). A synonym of *S. saccata*.

**S. Reichenbachiana** (Reichenbach's). *fl.* of a delicate shining white; sepals and petals becoming ochre-coloured; hypocyl becoming rosy, semi-globose, prolonged on the upper border into an angle; mesochil solid, with a deep channel, abrupt in front; epichil triangular, rather convex. Columbia, 1879. A curious plant, resembling *S. eburnea*, but larger and more conspicuous.

**S. Ruckeri** (Rucker's). "A noble species, with the habit of *S. Wardii*, and its general colour, except that it is paler; but the epichil is beautifully stained with pink, and the eyes of the hypocyl are very faint. It is distinctly separated by the peculiar form of the hypocyl, which, instead of being oblong, is so much narrowed to the base as to be obovate; by the entire want of lateral teeth on its margin; and by the presence of a very strong, inflexed tooth, in which the wide, not closed-up fissure of the mesochil terminates" (Lindley). Nicaragua, 1843. (L. J. F. 375, under name of *S. R. speciosa*.)

**S. saccata** (saccate). *fl.* greenish-yellow, regularly speckled, but not blotched, with brown, deep yellow at base, small; sepals and petals turned completely back on the ovary; hypocyl very deep and incurved; mesochil reduced to space sufficient for the development of two broad, flat horns; epichil oval, three-lobed; bracts shortened. Guatemala, 1836. *SYN.* *S. radiosa* (I. H. vii. 270).

**S. Shuttleworthii** (Shuttleworth's). *fl.* having the sepals, petals, and basal part of the lip apricot-colour, with dark purple blotches; front part of the lip whitish-yellow, with dark purplish spots on the anterior blade; column whitish, with a green middle part, spotted with purple on the inside. Columbia, 1876. This is allied to *S. insignis*.

**S. tigrina** (tiger-marked).\* *fl.* deep orange-yellow, richly blotched with purplish-brown, powerfully scented, as much as *sin.* in diameter; hypocyl roundish, yellow, having radiating, toothed lamellæ within the cavity; mesochil two-horned; epichil oval, equally trifid, equalling the flat, falcate horns; column excessively broad; raceme three or four-flowered. July to September. *l.* large, broadly lanceolate, deep green, plicate. Mexico, 1836. There is, without doubt, the finest species of the genus. (B. M. 4197; B. R. 1839, 1; F. d. S. 713-5, under name of *S. t. superba*.)

**S. t. lutescens** (yellowish). *fl.* brilliant yellow, inclining to orange, barred with deep chocolate, very large and handsome. Guatemala. A grand variety for exhibition.

**S. t. nigro-vioacea** (blackish-violet). *fl.* wholly of a deep brown-purple, except the edges of the sepals and petals and the upper half of the lip.

**Stanhoea**—continued.

**S. triicornis** (three-horned). *fl.* whitish-ochre, with darker tips, having crimson spots on the disk and base of the petals and on the base of the sepals; dorsal sepal reflexed over the ovary, the lateral ones spreading; petals entirely covering the lip; hypocyl marked on the outside with white, longitudinal lines, rough within and purple dotted, half-globular; epichil orange-ochre, having a third horn at the base in addition to the two present at the side; horns ligulate, acute; peduncle pendent, two-flowered. Pseudo-bulbs small. Peru, 1879. (L. & P. F. G. i. p. 31; F. M. u. s. 469.)

**S. velata** (veiled). A synonym of *S. Martiana*.

**S. venusta** (charming). A form of *S. Wardii*.

**S. Wardii** (Ward's).\* *fl.* showy, and deliciously scented; sepals and petals golden-yellow, much dotted with purple; lip pale yellow, with two large, dark velvety-purple spots on the deep yellow, oblong, depressed hypocyl; mesochil having two fleshy horns dotted with purple; epichil roundish-ovate, acute, with two semi-terete, falcate, sub-cirrhose horns, also thickly spotted with purple; racemes drooping, several-flowered. *l.* broad, acuminate, plicate. Guatemala and Venezuela, 1835. (B. M. 5289; L. S. O. 20.) *S. venusta* is a whole-coloured variety of this species. *S. graveolens* (F. d. S., Aug., 1846) is a form of *S. Wardii*, having flowers of a dirty-white colour, merging into golden-yellow at the centre.

**S. W. aurea** (golden). *fl.* of a deep orange-yellow, large and fragrant; hypocyl bearing two dark spots "which are in some manner lost in the flood of yellow that surrounds them" (Lindley). Summer and autumn. 1835. *SYN.* *S. aurea*.

**S. Warscewicziana** (Warscewicz's). *fl.*, sepals and petals dirty-white, the latter very acuminate; hypocyl yellowish-white, globose, highly glabrous within; mesochil two-horned, deeply sulcate, with reflexed teeth; epichil finely dotted with red; horns very acute, incurved; column broadly winged, unguiculate; bracts much shorter than the ovary. Chiriqui Mountains. (R. X. O. ii. 125.)

**S. xytriophora** (pitcher-bearing). *fl.* of a pale straw-yellow, with purple markings on the base of the lip and purplish dots on the rhomboid epichil; hypocyl remarkably short. Peru. 1868.

**STANHOPEASTRUM ECORNUTUM.** See **Stanhoea ecorruta**.

**STANLEYA** (named in compliment to Edward Stanley, Earl of Derby, who took an interest in many sciences, especially ornithology). *ORD.* *Cruciferae*. A genus comprising three species of stout, hardy, glaucous, perennial herbs, confined to California. Flowers yellow, many in elongated, straight racemes; sepals short, spreading; petals narrow, elongated, long-clawed. Leaves undivided or pinnatifid. *S. pinnatifida*—the only species introduced to cultivation—is a pretty plant, thriving in vegetable mould, in the open border. It may be increased by seeds, or by divisions.

**S. pinnatifida** (pinnatifid-leaved). *fl.* yellow, very closely resembling those of a species of *Cleome*. May. *l.* interruptedly pinnatifid, thick, similar to those of a species of *Brassica*. *h.* 3ft. 1312.

**STANNIA.** A synonym of *Posoqueria* (which see).

**STAPELIA** (named by Linnæus after Boderus à Stapel, a physician of Amsterdam, and commentator on Theophrastus; he died in 1631). *Carrion Flower*. Including *Caruncularia*, *Gonostemon*, *Orbea*, *Tridentea*, and *Tromotricha*. *ORD.* *Asclepiadaceæ*. A large genus (upwards of sixty species have been described) of low, thickly fleshy, leafless, greenhouse succulents, confined to South Africa. Flowers usually large and showy, but having a fœtid odour (like carrion), solitary, twin, or rarely fasciated, at the base or sides of the branches, on short, or rarely long, peduncles; calyx five-parted, with five glands within the base; corolla livid-purple or pale yellow, spotted and marbled, with a very short tube, and a much-spreading, five-lobed limb, the lobes broad or narrow, valvate; corona double, the outer horizontally spreading and deeply five-lobed, the inner consisting of five scales; stamens affixed at the base of the corolla. Stems deeply four-angled and toothed; young specimens sometimes having a caducous, rudimentary leaf at the apex of the teeth. A selection of the species most worthy of cultivation is given below. All require a thoroughly well-drained compost. This can be obtained by using a

**Stapelia**—continued.

good supply of pieces of brick rubbish amongst the sandy loam in which they are potted. During winter, they should have but little water. A shelf near the glass, in a light, sunny, airy place, is best adapted for them. Propagated by cuttings. Several plants formerly included under *Stapelia*, will now be found under **Duvalia**, **Huernia**, **Piранthus**, and **Podanthes** (which see).

**S. anguinea** (snake-speckled). *fl.* glabrous; corolla yellow, marked with numerous rufous spots; orb large, marked with large spots of two forms, dark brown-yellow on the sides near the base; gynostegium dotted with dark brown; peduncles solitary in the axils of the branchlets. June and July. Branches erect, with sub-recurved teeth. *h.* 6in. 1812. (L. B. C. 828; B. M. 1169, under name of *S. picta*.)

**S. Asterias** (star-fish).\* Starfish Flower. *fl.* large; corolla of an obscure violet-colour, the segments variegated with transverse, yellowish stripes, the bottom dark purple; segments lanceolate, oblique, with revolute margins, ciliated, wrinkled; peduncles often solitary. May to November. Branches many, erect, toothed; teeth short and erect, or slightly incurved with an acumen. *h.* 6in. 1795. One of the handsomest species. (B. M. 536; L. B. C. 453.)

**S. barbata** (bearded). A synonym of *Huernia barbata*.

**S. Bayfieldii** (Bayfield's). *fl.*, corolla 2½ in. to 2½ in. in diameter, with the lobes expanded; back puberulous, green, tinged with purple, the nerves darker; face glabrous, purple-red, darker towards the tips, the centre to half-way up the lobes marked with numerous pale yellow, transverse lines; ligulæ dull brownish-red or dark purple-brown; peduncles two lines long, three to five-flowered; pedicels eight to ten lines long. Stems erect, branching at base, 6in. to 6in. high, seven to nine lines thick, puberulous, with concave sides, and stout, short, nearly horizontal, teeth. Before 1877. (G. C. n. s., vii. p. 430.)

**S. bufonis** (toad-like). A synonym of *S. normalis*.

**S. campanulata** (bell-shaped). A synonym of *Huernia campanulata*.

**S. Corderoyi** (Corderoy's). A synonym of *Duvalia Corderoyi*.

**S. Courcelli** (Courcell's). A garden synonym of *S. patentirostris*.

**S. Curtisii** (Curtis's). *fl.*, corolla much spreading, deeply five-cleft; segments sulphur-colour, with transverse, oblong spots of dark blood-colour, ovate, acuminate, glabrous; tube yellowish; peduncles one-flowered, reflexed. June to September. Branches tetragonal, with acute, or slightly reflexed, teeth. *h.* 1ft. 1690. (B. M. 26 and R. H. 1857, p. 43, under name of *S. variegata*.)

**S. deflexa** (deflexed). *fl.*, corolla deeply five-cleft, about 2in. in diameter; segments lanceolate, acute, dingy greenish or pale reddish, ciliated, revolute on the margins, wrinkled; pedicels on a short and thick peduncle, much spreading, one-flowered. Summer. Branches ascending, erect, glabrous, tetragonal, with erect teeth on the angles. 1815. *h.* 4in. to 6in. (B. M. 1690; L. B. C. 135.)

**S. divaricata** (divaricate-branched). *fl.*, corolla greenish-brown outside, flesh-coloured within, tipped with green, glabrous, shining; segments lanceolate, spreading, with revolute, ciliated edges; corona orange, the outer segments mucronate; pedicels twin or tern. June to November. Branches numerous, tetragonal, glabrous, gradually attenuated, with small, erect teeth. *h.* 6in. 1793. (B. M. 1007; L. B. C. 941.)

**S. eruciformis** (caterpillar-like). A garden synonym of *S. olivacea*.

**S. gemmiflora** (bud-flowered). *fl.*, corolla large; segments dark fuscous, spotted with yellow at the throat, transversely and loosely wrinkled, ovate, acute; peduncles two or three. October and November. Branches many, erect, tetragonal, with sub-erect, acute teeth. *h.* 6in. 1795. (B. M. 1835.)

**S. gigantea** (gigantic). *fl.* pale yellowish, covered with irregular, brownish-red lines, and suffused with reddish around the corona, of an enormous size, 12in. to 14in. in diameter, the surface wrinkled, and sparsely covered with short, pale hairs; lobes lanceolate, acuminate, the margins fringed with similar hairs; corona dark purplish-brown. Stems resembling those of *S. Plantii*. *h.* 6in. 1862. The finest plant of the whole genus. (G. C. n. s., vii. p. 693.)

**S. glabriflora** (glabrous-flowered). *fl.*, corolla deeply five-lobed; lobes lanceolate, acuminate, at first spreading, and then 3in. to 4in. in diameter, afterwards strongly reflexed, the face entirely glabrous without a fringe, dull red-purple, with numerous transverse, yellowish-white lines; corona dark purple-brown, the ligulæ linear, concave, recurved at apex, obtuse, with a minute tooth; wings free to the base, divergent, oblong, obtuse; pedicels ½ in. long, pubescent. Stems pubescent, erect, quadrangular. *h.* 4in. to 8in. 1862. This is known in gardens as *S. grandiflora minor*. (G. C. n. s., vi. p. 809.)

**S. grandiflora** (large-flowered). *fl.* large, rather flat; corolla dark purple at the bottom, but the ovate-lanceolate segments are of a lighter purple, ciliated with grey hairs, and striped with white; peduncles three-flowered. September to December.

**Stapelia**—continued.

Branches quadrangular, clavate, downy, with remote tubercles or teeth. *h.* 1ft. 1795. Plant grey from down. See Fig. 522 (R. H. 1858, p. 152.)



FIG. 522. STAPELIA GRANDIFLORA.

**S. g. lineata** (lined). This only differs from the type in the corolla lobes being marked across the basal half with yellow lines. 1873. (G. C. n. s., vii. p. 559.)

**S. g. minor** (lesser). A garden synonym of *S. glabriflora*.

**S. Gussoneana** (Gussone's). A synonym of *Boucaerosia europæa*.

**S. hamata** (hooked). *fl.*, corolla blood-coloured, 3in. across, flat, ciliated, wrinkled above, with a hairy centre; segments transversely striped with white, acuminate, ciliated with red hairs; outer coronal segments emarginate, the inner leaflets linear-subulate, hooked. July and August. Branches erect, tetragonal, shining green; young ones sulcate; adults flatter, with short, erect or incurved, pale teeth. *h.* 3in. 1820. (L. B. C. 242.)

**S. hirsuta** (hairy). *fl.*, corolla yellowish, with transverse, deep violet stripes, a pale red, villous bottom, and red nectaries, wrinkled; segments villously ciliated with white hairs; outer coronal segments acute, lanceolate, the inner leaflets spreading. July and August. Branches erect, slightly villous, dingy green, sulcate-tetragonal, floriferous at the base, the angles having erect teeth. *h.* 6in. 1710. (H. E. F. 230.) The variety *atra* has deep purple flowers. (B. R. 756.)

**S. laevis** (smooth). *fl.* showy; corolla segments lanceolate, acute, green beneath, purple above, yellowish at apex, dotted with dark red; peduncles long, one-flowered; inner coronal leaflets carunculate. June to November. Branches stout, and, as well as the branchlets, oblong, smooth, obscurely sulcate, not toothed. *h.* 3in. 1790. (B. M. 793, under name of *S. pedunculata*.) SYN. *Caruncularia pedunculata*.

**S. maculosa** (spotted). *fl.* very foetid; corolla smooth, ciliated; segments dirty yellow, red at the tips and edges, almost covered by large, confluent, rufous spots, ovate, acute; orb wavy, elevated, downy; peduncles three or four, aggregated at the bases of the younger branches. June to September. Branches very numerous, erect, glabrous, green; adults loosely pubescent, tetragonal, with spreading teeth. *h.* 1ft. 1804. (B. M. 1835.)

**S. Massoni** (Masson's). *fl.* 4in. to 4½ in. in diameter; corolla brownish-purple, marked with a few, narrow, yellowish lines on the glabrous lobes, and the disk thickly covered with fine, short,

**Stapelia**—continued.

purple hairs. July. Branches quadrangular, pubescent. An old garden plant.

- S. mutabilis** (changeable). *fl.*, corolla greenish-yellow, with numerous transverse, purple stripes, ciliated with red, clavate, tremulous hairs; inner branch of the inner corona clavate; ligule three-toothed; peduncles usually in twos or threes. June and July. Branches erect, tetragonal, narrow, with erect, obtuse teeth. *h.* 6in. 1823.
- S. namaquensis** (Namaqualand)\* *fl.* large; corolla bright yellow, with crowded and more or less confluent, dark purplish-brown spots; lobes much wrinkled, not fringed; outer coronal lobes entire, acute. Branches thick, glabrous, beautifully mottled. *h.* 3in. to 4in. 1883. One of the handsomest species.
- S. n. tridentata** (three-toothed). *fl.* having the corolla lobes fringed with short hairs, and the outer coronal lobes truncately three-toothed at apex. 1883.
- S. normalis** (normal). *fl.*, corolla much spreading, 2in. or more in diameter; segments yellow, with transverse stripes and spots of dark blood-colour, ovate, acute, outwardly of a pale sulphur-colour, lined; peduncles solitary, one-flowered, much spreading. July and August. Branches many, decinate or ascending, glabrous, tetragonal, with much-spreading teeth. *h.* 6in. 1821. (B. R. 755; B. M. 1676, under name of *S. bufonis*.)
- S. olivacea** (olive-coloured). *fl.* very fertile, two to six from the bases of the younger branches; corolla dull green and puberulous outside, glabrous within, with numerous crowded, brown, transverse rugæ on a dark olive-green or sometimes pale olive ground, about 1½in. in diameter; coronal scales dark purple-brown; peduncles two to three lines long. September. Stems erect, rather slender, branching at base, minutely puberulous, 3in. to 5in. high, ½in. to ¾in. thick, with rounded edges, becoming blotched with purple on full exposure to the sun. 1874. (B. M. 6212; G. C. n. s., iii. p. 137.) *SYN. S. eruciformis* (of gardens).
- S. orbicularis** (orbicular). *fl.*, corolla pale yellow, having approximate, brownish lines on the segments, much spreading; segments cordate, recurved at apex, acuminate, striate-wrinkled; orb yellow, dotted with brown, tumid; peduncles near the base of the branchlets, solitary, one-flowered. July to November. Branches many, erecto-patent, tetragonal, with mucronulate teeth. *h.* 6in. 1799. (A. B. R. 439; F. d. S. 1281; L. B. C. 811.)
- S. patentirostris** (spreading-beaked). *fl.* one to three together, on pedicels ½in. long; corolla 2½in. to 3½in. in diameter, the face wrinkled, rich dark purple-brown, with numerous transverse, yellowish lines on the basal part of the lanceolate, acuminate lobes, the centre densely villous with rich purplish-red hairs, the lobes fringed with long, pale purple hairs; ligule linear-lanceolate, obtuse, with a central tooth; wings linear-oblong, horizontal; rostra subulate, horizontally recurved over the wings, reaching nearly to the sinuses of the corolla. Autumn. Stems rather slender, puberulous, toothed. *h.* 6in. 1870. Also cultivated under the name of *S. Courcelii*. (G. C. n. s., vii. p. 140; B. M. 5963, under name of *S. sororia*.)
- S. pedunculata** (long-peduncled). A synonym of *S. levis*.
- S. picta** (painted). *fl.*, corolla sulphur-coloured, marbled and spotted with dark blood-colour; segments ovate, acuminate, wrinkled; orb elevated, much wrinkled, depressed in the middle; peduncles from the base of the branchlets, solitary, one-flowered. June to September. Branches simple, erect, tetragonal or quadrilate, slightly tortuose. *h.* 6in. 1799.
- S. planiflora** (flat-flowered). *fl.*, corolla much spreading, half-quinquefid; segments pale sulphur-coloured, lined and spotted with dark purple, ovate, acuminate, transversely wrinkled; peduncles from the axils of the younger branchlets, solitary or twin, one-flowered. July to November. Branches many, branched, ascending or nearly erect, glabrous, sulcate-tetragonal, with much-spreading teeth. 1805. (L. B. C. 191.)
- S. Plantii** (Plant's). *fl.* on stout, pubescent peduncles; corolla 5in. in diameter, villous round the throat; lobes purplish-brown in the centre, and there transversely barred with wavy, yellow bands, broadly black-purple at apex and on the margins, 1in. to 1½in. broad, ovate-lanceolate, ciliated with long hairs. November. Stem stout, creeping; branches downy, 5in. to 9in. long, erect, columnar or sub-clavate, with four thick, remotely-toothed wings. 1866. (B. M. 5692; F. d. S. 2012.)
- S. pulvinata** (cushion-flowered). *fl.*, corolla deep violet, large, flat, elevated and very villous at the bottom; segments variegated with whitish, transverse wrinkles, fuscous and concave at the apex, rufous beneath, roundish, abruptly acuminate, ciliated; peduncles mostly solitary, terete, from the axils of the branchlets. June to November. Branches and branchlets many, reclinate, with erect, green teeth. 1795. A very elegant species. (B. M. 1240; L. B. C. 206.)
- S. revoluta** (revolute-flowered). *fl.* sub-solitary, on very short peduncles; calyx segments acute; corolla red, with whitish blotches, smooth, very fleshy, the segments revolute, with fringed margins. July. Branches tetragonal, erect, denticulated, the sides hollowed out. 1801. (B. M. 724.)
- S. rufa** (rufous). *fl.*, corolla glabrous; segments of an obscure violet, variegated with deep purple or pale red, transverse stripes, having the bottom stellate, rufous, and variegated, the margins ciliated with dark violet hairs; peduncles two or three together, short, purplish. June to November. Branches erect,

**Stapelia**—continued.

- tetragonal, with small, erect, obtuse teeth. *h.* 3in. to 6in. 1795. (L. B. C. 239.)
- S. Simsii** (Sims') *fl.*, corolla ample, flat, glabrous; segments dark violet, with slender, whitish lines about the throat, without greenish or obscurely tinged with violet, ovate, acuminate, five-nerved; peduncles erect, at the tips of the branchlets. May to November. Branches glabrous, the angles obsoletely nipped, toothed; teeth having a green, deciduous acumen. *h.* 3in. to 6in. 1800. (B. M. 1234, under name of *S. vetula*.)
- S. sororia** (sisterly)\* *fl.* 3in. to 4½in. in diameter; corolla clothed with long hairs; lobes dark vinous-purple, ovate, acuminate, transversely wrinkled, the folds towards the base bright orange-yellow; processes of the column deep purple; peduncles solitary or twin, 3in. to 4in. long. July. Stems 6in. to 10in. high, with erect or horizontal branches ½in. to ¾in. in diameter, the angles toothed at intervals of ½in. to ¾in., the teeth soft and incurved. 1797. Plant pale green, glabrous, variable in size. (L. B. C. 94.)
- S. spectabilis** (showy). *fl.*, corolla large, flat; segments ovate-lanceolate, furnished from the base behind the middle with dense, red hairs, and having pale stripes on the upper surface, with black tips. November to January. Branches quadrangular, clavate, toothed on the angles, the teeth remote, incurved, whitish. *h.* 1ft. 1802. (B. M. 585, under name of *S. grandiflora*.)
- S. stricta** (straight). *fl.*, segments of corolla purple, with pale greenish margins, ovate, acuminate, nearly flat, glabrous, not ciliated; peduncles growing from the base of the branches. June to November. Branches tetragonal, smooth, simple, straight. *h.* 3in. 1814. (B. M. 2037.)
- S. tsomoensis** (Tsomo River). *fl.*, calyx lobes ½in. long; corolla 3in. in diameter, the face entirely dull smoky-purple, darker at the tips of the lobes, or with some of the ridges greenish or dirty-yellowish, the disk and base of the lobes covered with purple hairs; lobes ovate-lanceolate; outer coronal segments purplish-black; pedicels ½in. to 1in. long; cymes sub-sessile, four to nine-flowered. Summer. Stems 4in. to 6in. high, five to eight lines thick, the angles compressed, repand-toothed, very minutely puberulous. 1882.
- S. unguipetala** (claw-petaled). *fl.* 4in. to 4½in. in diameter; corolla rich purple-brown, marked two-thirds the way up the lobes with transverse, yellowish lines, the centre of the disk and five bands radiating to the sinuses, pale greenish-ochre; lobes lanceolate-attenuate, incurved-hooked at apex, fringed with long, pale purplish hairs, and the disk covered with long, silky, purplish-red hairs, the rest glabrous; ligule lanceolate, acute, and, as well as the free, deoid-oblong wings and the recurving rostra, dark purple-brown. *h.* 6in. 1877. Allied to *S. patentirostris*. (G. C. n. s., vii. p. 335.)
- S. variegata** (variegated). A synonym of *S. Curtisii*.
- S. vetula** (oldish). A synonym of *S. Simsii*.

**STAPHIDIATRUM**. A synonym of **Sagraræ** (which see).**STAPHIDIUM** (in part). Synonymous with *Clidemia*.

**STAPHYLEA** (from *staphyle*, a cluster; alluding to the disposition of the flowers and fruits). Bladder-nut Tree. *SYN. Bumalda*. *ORD. Sapindaceæ*. A small genus (five species) of hardy, branched shrubs, natives of Europe, the Himalayas, Japan, and North America. Flowers white, erect or pendulous, in axillary racemes or panicles; sepals five, equal, deciduous; petals five, erect, about as long as the calyx, imbricated; stamens five; pedicels bracteate, articulated. Capsule membranous, bladder-like. Leaves opposite, stipulate, three to five-foliolate or pinnate; leaflets involute in vernation, stipellate. The under-mentioned species thrive in ordinary soil. *S. colchica* is an excellent subject for forcing, when specially prepared for the purpose. Propagation may be effected, in autumn, by suckers, by layers, or by cuttings.

- S. Bolanderi** (Bolander's). *fl.*, sepals three lines long; petals a little longer; style and stamens much exserted. *l.*, leaflets three, glabrous, broadly oval or orbicular, abruptly acute, serrulate. California, 1883.
- S. Bumalda** (Bumalda). *fl.*, styles villous. June to August. *fr.*, capsule with two beaks. *l.* trifoliolate; leaflets oblong, acuminate, rather scarious; serratures awned, protruding from the recesses of the crenæ. *h.* 6ft. Japan, 1812. (S. Z. F. J. 95.)
- S. colchica** (Colchican)\* *fl.* seven to eight lines long; sepals and petals linear-spathulate, the former spreading; raceme terminal, erect or slightly nodding, compound, ovate, corymbose. Summer. *l.* ternate and pinnately five-foliolate, 4in. to 5in. long; leaflets approximate, ovate-oblong, acuminate, serrulated, puberulous towards the base beneath. *h.* 3ft. to 5ft. Caucasus. See Fig. 523. (G. C. n. s., xi. 117; R. G. 837; R. H. 1870, 285.)
- S. pinnata** (pinnate)\* Job's Tears; St. Anthony's Nut. *fl.* in racemes. May and June. *fr.*, nuts globose, white, pistachio-

**Staphylea**—*continued*.

flavoured, in a bladder capsule. *l.* pinnate, of five to seven oblong, glabrous, serrated leaflets. *h.* 6ft. to 12ft. South Europe. (Sy. En. B. 322.)

**S. trifolia** (three-leaved). *fl.*, petals obovate-spathulate, ciliated at base. May and June. *fr.*, nuts globose. *l.* trifoliate; leaflets ovate, acuminate, regularly serrated, pubescent when young. *h.* 6ft. to 12ft. North America, 1640.

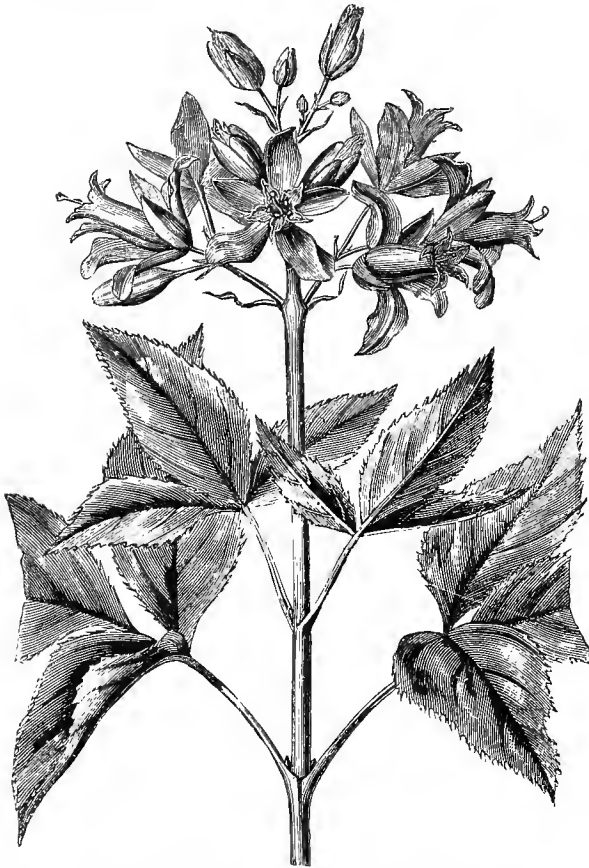


FIG. 523. FLOWERING BRANCH OF STAPHYLEA COLCHICA.

**STAPHYLEE.** A tribe of *Sapindaceæ*.

**STAPHYLINIDÆ.** A family of the large group of *Brachelytra*, the "Rove" or "Cocktail" Beetles. The species of this group agree in having the wing-cases,

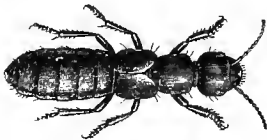


FIG. 524. DEVIL'S COACH HORSE (GOERIUS OR OCYPUS OLENS).

or elytra, very short (see Fig. 524), as indicated by the scientific name, which is derived from *brachys*, short, and *elytra*, the wing-cases. Their wings are, nevertheless, large, and have, accordingly, to be folded up, and packed away below the elytra. The hinder end of the bare abdomen is employed to help in this, being turned up to push the wings under their covers; hence, they are often called Cocktail Beetles. The name Rove

**Staphylinidæ**—*continued*.

Beetles refers to their active roving habits. There are many genera in the family *Staphylinidæ*, but they mostly differ too little to be distinguished by anyone save a practised entomologist. Few of them are over  $\frac{1}{2}$  in. in length, though one or two exceed lin.; many are microscopic in size. They are very often black, but frequently this is varied with yellow, reddish-brown, or rusty-red. These beetles vary greatly in habits. They are very abundant, and are, accordingly, to be met with everywhere. Towards the end of summer, they may be found crawling on the ground or on walls and palings, or on the wing; and the small species are but too familiar from their liability to fly into one's eyes or mouth. Over 200 species are known to occur in Britain. They may often be found in the utmost profusion in the dead bodies of animals, or in decaying remains of plants, both as larvæ and in the perfect state. Some of them are among the most efficient allies of gardeners, because of their influence in destroying noxious insects. None of them are injurious to healthy garden produce. The two species figured, viz., *Goerius olens*, or the "Devil's Coach Horse," and *Staphylinus*



FIG. 525. STAPHYLINUS ERYTHROPTERUS (slightly magnified).

The Line shows the actual length of the Insect.

*erythropterus* (see Figs. 524 and 525) give a fair idea of the appearance of the family. The former preys on insects.

**STAR APPLE.** See *Chrysophyllum*.

**STARCH.** The greater part of the food material stored up by green plants for future use in their nourishment, and in the formation of new tissues, is formed of Starch. In those parts of plants in which food is stored, e.g., in the tubers of Potatoes, in the pith of many plants, and in the albumen (or perisperm) in seeds of Cereals, Peas, and many other plants, Starch is very abundant, packed away in the cells in the form of small grains. These grains are frequently rounded, but may assume peculiar forms characteristic of certain plants. When very numerous, they become polygonal by mutual pressure. Under the microscope, each granule is seen to have a dark point, called the *hilum*, at one place; and around this are light and dark layers alternately. This appearance of layers, it is believed, is due to their containing a varying amount of water, as it is not apparent when the grains are either saturated or thoroughly dried. Often two or more granules are more or less completely united, forming "compound" granules. Though always small, they vary greatly in size in different plants. They are most readily recognised by running a solution of Iodine and Potassic Iodide under the cover glass, when the granules become some shade of indigo-blue, varying with the strength of the solution. Starch consists of Carbon, Hydrogen, and Oxygen, in the proportions indicated by its chemical formula,  $C_6H_{10}O_5$ . This composition is the same as that of cellulose, the substance of which cell-walls are composed; and it is very nearly the same as that of several of the sugars, into which Starch is converted by a kind of slight fermentation. Starch is produced in the presence of light in the chlorophyll-bodies, and, therefore, only in the green parts of plants.

**Starch**—continued.

There is much doubt as to the exact part played by chlorophyl; most botanists believe that it forms the Starch granules, but others follow Pringsheim in thinking that the chlorophyl is only a shield against exposure to too intense light of the protoplasm, which they regard as the actual agent in the production of Starch. Whichever view is correct, the Starch is largely built up from the Carbon and Oxygen of Carbonic Acid gas in the atmosphere. The granules are not soluble in water, so, when there is need to convey Starch from one part of the plant to another, it is changed into a sugar, which is soluble, and, in this form, passes along to where it is to be used in building up new cell-walls, or where it must be stored up for a time. In the latter case, the Starch granules are again formed by the action of small pieces of protoplasm, named Starch-generators, which are fixed to the part of each granule farthest from the hilum.

**STARFISH FLOWER.** See *Stapelia Asterias*.

**STAR FLOWER.** A common name for several species of *Aster*, *Sternbergia*, *Triteleia*, and *Trientalis*.

**STAR HYACINTH.** See *Scilla amœna*.**STARKEA.** A synonym of *Liabum* (which see).

**STAR OF BETHLEHEM.** See *Ornithogalum umbellatum*. The name is also applied to other species.

**STAR OF NIGHT.** A common name for *Clusia rosea*.

**STARRY.** Arranged in rays like the points of a star.

**STAR, SEA.** A popular name for *Aster tripolium*.

**STARWORT.** A common name for *Aster* and *Stellaria* (which see).

**STATICE** (the Greek name, used by Pliny for some astringent herb; from *statikos*, astringent). Sea Lavender. Syn. *Taxanthema*. ORD. *Plumbaginæe*. A large genus (upwards of 120 species have been described) of greenhouse, half-hardy, or hardy herbs, sub-shrubs, or shrubs, chiefly inhabiting saline districts and shores of temperate seas, most commonly found in Western Asia. Flowers one or two in the bracts, or often in few-flowered, many-bracted spikelets; calyx usually funnel-shaped, with a scarious, spreading limb; petals connate with the stamens in a ring towards the base, or free to the base; bracts subtending the spikelets, small, scale-like; peduncles or scapes leafless, often branched, cymose, corymbose, or paniculate. Leaves in the stemless species radical and rosulate, in the tufted sub-shrubs clustered, in the small shrubs somewhat scattered at the sides of the branches, alternate, flat, sometimes entire, linear, spatulate, oblong, or obovate, sometimes sinuately pinnatifid or dissected. *S. auriculæfolia*, *S. bellidifolia*, and *S. Limonium*, are included in the British Flora. The hardy species thrive in sandy soil, in the open border, or on rockwork. Their flowers are excellent for cutting, and for intermixing with other flowers in glasses, &c.; they are also well adapted for drying like everlasting. Annual and biennial species may be propagated from seeds, sown in early spring, in a frame, the young plants being put out into their permanent places when large enough. The perennials may also be raised from seeds when any are procurable, or increased by means of careful division. Greenhouse Statice are very useful and ornamental plants, nearly always more or less in flower. They succeed in good, turfy loam, with a little charcoal or sand intermixed, and may be increased by cuttings, inserted in small single pots, during early spring, and placed under a bell glass.

A selection of the most popular species, from a horticultural standpoint, is given below. Except where otherwise stated, the plants are herbaceous perennials.

**Statice**—continued.

**S. ægyptiaca** (Egyptian). A synonym of *S. Thounii*.

**S. arborescens** (tree-like).\* *fl.* blue; spikelets two-flowered, few, in short, second, rather loose spikes; floral branches very short; scape tall, branched above, ample and sub-corymbosely panicled. July. *l.* ample, ovate-oblong, petiolate, obtuse, mucronate, attenuated at base. Stem branched above, at length leafy. *h.* 2ft. Tenerife, 1829. Greenhouse shrub. (B. 47; B. M. 3776; B. R. xxv. 6 and P. M. B. iv. 217, under name of *S. arborescens*.)

**S. Bonduelli** (Bonduelle's). *fl.* yellow, sessile, in terminal corymbs; peduncles repeatedly dichotomous, clavate; bracts scarious. June. *l.* radical, lyrate, attenuated to the petioles, dilated at apex, terminating in a subulate mucro, pilose above, villous beneath. Stems tufted, branched, hairy at base. *h.* 1ft. North Africa, 1859. Greenhouse. (B. M. 5158; F. d. S. 2129; R. G. 318; R. H. 1885, p. 276.)

**S. Bourgæi** (Bourgeau's). *fl.* purple and white; spikelets one or two-flowered, two or three in fascicles at the extremities of the branchlets; lower bracts slightly reddish; scape compressed, 6in. to 12in. high, corymbosely paniculate above. August. *l.* ample, petiolate, stellate-puberulous, oblong, attenuated at base, slightly sinuate or often lyrate, the terminal lobe ovate, obtuse, mucronate. Canary Islands, 1859. Greenhouse sub-shrub. (B. M. 5153; F. d. S. 2292.)

**S. brassicæfolia** (Brassica-leaved). *fl.* purple; spikelets two-flowered, two or three fasciculate at the tips of the branchlets; lower bracts rufous, puberulous; scape angled, paniculately corymbose above. August. *l.* few, slightly ciliated on the margins, petiolate, lyrate; terminal lobe large, roundish-ovate, often irregularly lobed, very obtuse, cuspidate, sub-cordate at base; lateral ones two to four, ear-like, small, alternate, often confluent at base. *h.* 1ft. Canary Islands, 1859. Greenhouse sub-shrub. (B. M. 5162.)

**S. callicoma** (beautiful-haired).\* *fl.* pink; spikelets two-flowered, in short, rather broad, distichous spikes; scape dwarf; panicle ovate-triangular, sub-secund, the branches trigonous. July. *l.* oblong and oblong-lanceolate, attenuated into the petioles, mucronate, white-tubercled, puberulous or glabrous. *h.* 1ft. Russia, 1804. Half-hardy. (R. G. 1063; B. M. 1629, under name of *S. conspicua*.)



FIG. 526. STATICE ELATA.

**S. elata** (tall).\* *fl.* blue; spikelets two-flowered, in ovate, distichous, rather loose, imbricated spikes; bracts ovate, white-margined; scape 2ft. high, elongated-paniculate above, the branches hairy, trigonous. July. *l.* obovate, very obtuse, often retuse and shortly mucronate at apex, rather long-attenuated into the petioles. Southern Russia, 1820. Hardy. See Fig. 526.

**S. eximia** (choice). *fl.* lilac, rose; spikelets about four-flowered, disposed in very dense, scorpioid-capitate, much-imbricated spikes; bracts pubescent; scape tall, paniculate or branched above, terete, pubescent. August. *l.* oblong or obovate, obtuse, shortly petiolate, narrowed, slightly crisped on the margins, long-attenuated into the petioles. *h.* 1ft. Songoria, 1844. Hardy. (B. R. 1847, 2.)

**S. floribunda** (bundle-flowered).\* *fl.* violet-blue, produced in dense heads. 1822. A handsome plant, much resembling *S. profusa*.

**S. Fortunei** (Fortune's). A synonym of *S. sinensis*.

**S. fruticans** (shrubby). *fl.* blue; spikelets one or two-flowered, very few, in second, very short, imbricated spikes; lower bracts ciliate-margined; scape 4in. to 6in. high, corymbosely-paniculate or branched above, puberulous, closely compressed. Summer. *l.* near the base of the scape, ovate, 1½in. to 2in. long, ob-



**Statice—continued.**

tuse, mucronate, shortly attenuated into the petioles. Stem short, naked, terete. Canary Islands, 1847. Half-hardy shrub. (R. G. 319; F. d. S. 325, under name of *S. frutescens*.)

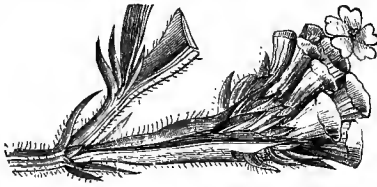


FIG. 527. *STATICE SINUATA*, showing Habit and detached Inflorescence.

**S. Halfordii** (Halford's). A garden variety of, or hybrid from, *S. macrophylla*.

**S. imbricata** (imbricated). *fl.* blue; spikelets three or four-flowered, few, in short, fascicled spikes; bracts velvety; scape tall, amply corymbose above, with undulated and broadly-winged branches. Summer. *l.* lanceolate, lyrate-runcinate, with eight or nine lobes on each side, setose-mucronate, 9in. to 10in. long. *h.* 1½ft. Teneriffe, 1823. A half-hardy, slightly tomentose sub-shrub. (F. d. S. 320, 321.)

**S. incana** (hoary), of Bieberstein. A synonym of *S. tatarica angustifolia*.

**S. Kaufmanniana** (Kaufmann's). *fl.* pink; scape 6in. to 16in. long, bearing several ascending spikes. Summer. *l.* all radical, lanceolate, acuminate, crisped, with thick margins. *h.* 1ft. Turkestan, 1880. A pretty, hardy perennial. (R. G. 996.)

**S. latifolia** (broad-leaved).\* *fl.* blue; spikelets one (rarely two) flowered, rather remote, forming loose, very slender, slightly recurved spikes; bracts glabrous; scape tall, much-branched; panicle ample, effuse. June. *l.* large, oblong-elliptic, obtuse, long-attenuated into the petioles. *h.* 1ft. South Russia, 1791. Hardy.

**S. leptoloba** (slender-lobed). *fl.*, calyx purple, stellate, funnel-shaped; corolla yellowish, small; spikes about ½in. long, few-flowered; scape slender, repeatedly forked. Summer. *l.* all radical, oblanceolate-spathulate. Turkestan, 1881. Habit tufted. Hardy. (R. G. 1045.)

**S. macrophylla** (large-leaved).\* *fl.* white, twice as large as those of *S. arborescens*; spikelets two-flowered, twin, erect, at the tips of the branchlets; bracts velvety, the lower ones scarious-rufescent; scape tall, amply and much branched above, in a corymbose panicle. May. *l.* nearly glabrous, large, sessile, obovate-spathulate, very obtuse, the lower part long-attenuated, obsolete sinuate. *h.* 2ft. Teneriffe, 1824. Half-hardy sub-shrub. (B. M. 4125; B. R. xxxi. 7.)

**S. macroptera** (large-winged). *fl.* purple; spikelets two-flowered, in fascicles of two or three at the tips of the branchlets; wings of the floral branches very broad; scape tall, ample and spreading, very broadly paniculate-corymbose. Summer. *l.* slightly puberulous, at length glabrescent, ample, coriaceous, petiolate, lyrate; terminal lobe large, ovate, slightly acute, bristle-bearing at apex, sinuate-lobed; lateral ones much smaller, confluent. *h.* about 2ft. Canary Islands. Greenhouse. (I. H. iii. 105.)

**S. pectinata incompta** (comb-like, inelegant). *fl.* blue; spikelets three-flowered, distichous, in oblong, sub-scorpoid, spreading, densely imbricated spikes; lower bracts rufescent; scape leafy, decumbent. September. *l.* rosulate at the base of the scape, or fascicled or solitary near the axils of the scales, obovate, obtuse or retuse, mucronate, attenuated into the petioles. Canary Islands, 1780. A half-hardy, calcareous-dotted sub-shrub. (B. R. xxvi. 65, under name of *S. pectinata*.)

**Statice—continued.**

**S. profusa** (profuse).\* *fl.* disposed in well-branched, corymbose heads; calyx purple; corolla white. August. *l.* radical, 6in. to 8in. long, oval or somewhat spatulate, waved, leathery, shining, and dark green; outer ones prostrate. *h.* 2ft. A greenhouse hybrid between *S. puberula* and *S. Halfordii*. (F. M. 40.)

**S. puberula** (puberulous). *fl.* violet, as large as those of *S. arborescens*; spikelets two-flowered, few, at the tips of the branchlets, sub-distichous and rather loosely fascicled; bracts scarious-rufescent, pubescent; scape 3in. to 5in. high, paniculately corymbose. July. *l.* ½in. to ¾in. long, ovate-rhomboid, slightly acute, bristle-bearing at apex, long-ciliated on the margins, shortly attenuated into the petioles. Graciosa, 1830. A whitish-pilose or puberulous, half-hardy sub-shrub. (B. 182; B. M. 3701; B. R. 1450.)

**S. pumila alba**. A mere garden name.

**S. rosea** (rosy).\* *fl.* blue; spikelets one-flowered, clustered in short, terminal, horizontal spikes, with a flexuous rachis; bracts blackish, with white margins; scape terete, much-branched, paniculately corymbose above, tuberculate-scarious. May. *l.* obovate-oblong, attenuated into the petioles, rough-tubercled on both sides. Stem short, leafy. *h.* 5ft. Port Natal, 1840. Half-hardy sub-shrub. (B. M. 4055, under name of *S. rytidophylla*.)

**S. rytidophylla** (shrivelled-leaved). A synonym of *S. rosea*.

**S. sinensis** (Chinese). *fl.* yellow; spikelets two-flowered, in short, sub-second, terminal spikes; lower bracts ovate, obtuse; scape tall, dichotomously branched just above the base, corymbose-fastigiate. April. *l.* obovate-lanceolate, obtuse, long-attenuated into the petioles. Stem acutely angled. *h.* 1ft. China, 1845. Plant hardy, glabrous. (B. R. 1845, 63, and F. d. S. ii. 28, under name of *S. Fortunei*.)

**S. sinuata** (sinuate-leaved).\* *fl.* purple, yellow; spikelets three or four-flowered; spikes short, second, nearly horizontal, the upper branchlets densely imbricated; lower bracts reddish; scape dichotomous, paniculately corymbose, three to five-winged. August. *l.* lyrate-pinnatifid, with rounded lobes, the terminal ones bristle-bearing. *h.* 1ft. Levant, 1629. Half-hardy. See Fig. 527. (B. M. 71; S. F. G. 301.)



FIG. 528. *STATICE SUWOROWI*.



**Statice**—continued.

**S. spatulata** (spatulata-leaved). *fl.*, calyx white; corolla purple, obcordate, larger than the calyx; spikes in two rows; scape and branches perfectly round. August. *l.* radical, spatulate, obtuse, glaucous, entire. *h.* 1ft. Barbary, 1804. Hardy. (B. M. 1617.)

**S. speciosa** (showy). *fl.* white; spikelets three or four-flowered, in very short, scorpioid-capitate, distichous and very densely imbricated spikes; scapes densely corymbose above. July. *l.* nearly orbicular or oblong-obovate, abruptly attenuate-cuspidate, shortly narrowed at base. *h.* 1ft. South Russia, 1776. Half-hardy. (B. M. 656; L. B. C. 1356.)

**S. spicata** (spike-flowered). *fl.* pink or white; corolla lobes ovate; spikelets two to four-flowered; spikes terminal, or often many, sessile, cylindrical, very dense. Summer. *l.* rosulate, glabrous or slightly hairy beneath, oblong-lanceolate, long-attenuated into a short petiole, obtuse, mucronate, entire or lacinate. *h.* 6in. Asia, 1819. Hardy annual.

**S. Suworowi** (Suworow's).\* *fl.* of a pretty lilac-colour, produced in dense, branched spikes. Summer. *l.* radical, oblong-lanceolate, entire or coarsely runcinate. Turkestan, 1883. A strikingly beautiful, hardy annual. See Fig. 528. (G. C. n. s., xx. p. 393; R. G. 1095, f. 1-2.)

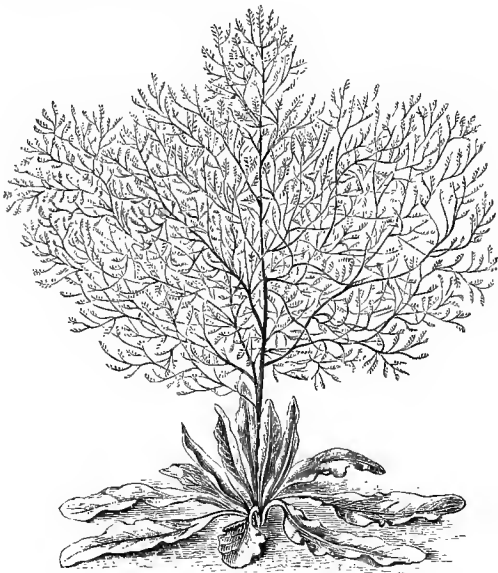


FIG. 529. STATICE TATARICA.

**S. tatarica** (Tartarian).\* *fl.* bright ruby-red, 4in. long; spikelets sub-unilateral on the branches, one to three-flowered; scape stiff, erect, 2in. to 3in. long, soon giving off a long, broad, recurved panicle. June and July. *l.* tufted, 4in. to 6in. long, oblong, spatulate, or oblanceolate, acuminate, mucronate, rigid, glabrous, narrowed into the petioles. *h.* 1ft. South-east Europe, 1731. Hardy. See Fig. 529. (B. M. 6537.)

**S. t. angustifolia** (narrow-leaved). A variety with narrower leaves than the type. SYN. *S. incana* (of Bieberstein).

**S. Thouini** (Thouin's). *fl.* yellow; spikelets two or three-flowered; spikes secund, very short, angled, straight; scape corymbose above, more or less broadly three-winged, sub-dichotomous. May. *l.* sinuate or lyrate-pinnatifid, the lobes and sinuses rounded, the margins shortly ciliated. *h.* 1ft. Tenerife, Greece, Palestine, North Africa, &c., 1829. A half-hardy, glaucous annual. SYN. *S. ægyptiaca* (B. M. 2363).

**STATUARY.** Like some other descriptions of garden furniture, Statuary requires to be associated with special accessories, in harmony with it. Statuary can seldom be introduced with entire satisfaction, except when associated with architectural or geometrical lines. Such positions may be found in terrace gardens, along the sides of long, straight walks, or as a terminal object to such walks or at places where they intersect, and sometimes, with good effect, at the end of a vista or avenue. It is seldom out of place in the conservatory, where, even should it not be introduced with faultless taste, it is less likely to absolutely offend, than a puerile attempt at rockwork

**Statuary**—continued.

and waterfall. As to the size of the groups and figures to be introduced into a given space, this must be determined on the spot; and, in order to arrive at a proper decision in so important a matter, it is a good plan to set up outlines, simply constructed of rough boards, and then to diminish or enlarge them, until they appear in harmonious proportion to the general features of the situation. The choice of subjects will be determined by the taste of the proprietor, or those whom he consults, and the expense to be incurred. When the latter does not permit of the introduction of marble or real stone, recourse may be had to the very good artificial stone or terra-cotta objects which have been found to stand the test of exposure.

It may be here remarked that Statuary, when exposed to the atmosphere, may be rendered more durable by the application of one of the patent colourless solutions sold for such purposes; but, for obvious reasons, paint should not be used.

**STAUNTONIA** (named after Sir George Staunton, a traveller in China). ORD. *Berberideæ*. A small genus (two species) of ornamental, hardy, evergreen, climbing shrubs, natives of China and Japan. Flowers monœcious; sepals six, petaloid, the outer ones broader; petals none; stamens six; racemes axillary, few-flowered. Leaves digitately three to seven-foliolate. One of the species is in cultivation. It thrives in sandy loam, and may be increased by cuttings of young, half-ripened shoots, inserted in sand. In autumn, the long, trailing shoots should be cut back, leaving only those from which flowers are desired.

**S. hexaphylla** (six-leafleted). *fl.*, white, fragrant. April. *l.* composed of six firm, deep green, elliptic-ovate, acute leaflets. 1876. (G. C. n. s., v. 597; S. Z. F. J. i. 76.)

**S. latifolia** (broad-leaved). A synonym of *Hobællia latifolia*.

**STAUANTHERA** (from *stauros*, a cross, and *anthera*, an anther; the anthers cohere in the form of a cross). SYN. *Anomorhægmia*, *Cyananthus* (of Griffiths), *Miquelia*, *Quintilia*. ORD. *Gesneraceæ*. A small genus (two or three species) of stove herbs, inhabiting the East Indies and the Malayan Archipelago. Flowers blue, mediocre or rather large, loosely cymose or unilaterally racemose; calyx broadly campanulate and five-cleft; corolla somewhat rotate-campanulate, with a bilabiate limb, the posterior lip bifid; perfect stamens four. Leaves ample, membranous, solitary in the nodes or opposite and stipuliform. For culture of *S. grandifolia*, the only species introduced, see **Klugia**.

**S. grandifolia** (large-leaved). *fl.* 1in. long; calyx pubescent; corolla tube white, tinged with purple and pale yellow; limb pale purple; throat white, with a deep yellow spot on the lower side; peduncles terminating in many panicles. August. *l.* often 10in. long, 4in. broad, oblong, inequilateral; petioles stout, 2in. to 4in. long. Stems and branches succulent. *h.* 1ft. Monheim, 1862. (B. M. 5409; F. M. 272.)

**STAUARITIS.** See **Stauropsis**.

**STAUROGLOTTIS.** Included under *Phalænopsis*.

**STAUROPSIS** (from *stauros*, a cross, and *opsis*, appearance; so called from the shape of the flower). Erroneously printed *Stauritis*. SYN. *Fieldia* (of Gandiaud). ORD. *Orchideæ*. A genus comprising about eight species of stove, epiphytall orchids, natives of the Malayan Archipelago (and the East Indies?). Sepals and petals free, much-spreading; lip continuous with the column, spreading, concave, not spurred, narrow, the lateral lobes short, the middle one rather long; pollen masses two; raceme few or many-flowered; peduncles lateral. Leaves distichous, spreading, coriaceous, flat. Stem leafy, not pseudo-bulbous. For culture of the three species known to gardeners, see **Vanda**.

**S. Batemanni** (Bateman's).\* *fl.* large and spreading; sepals and petals yellow, spotted with crimson in front, rosy-purple at back, fading to violet at the edge, thick and fleshy, falcate; lip purple-crimson, sacate at base, the front part furrowed and

**Staurosis**—continued.

incurved, the disk bearing an elevated tooth, and its base a short, transverse crest; scapes long, erect, many-flowered. July to September. *l.* lorate, obtuse, and obliquely emarginate at apex, light green. Stem stout. Philippine Islands. *SYNS.* *Friedia lisochiloides*, *Vanda Batemanni* (B. R. 1846, 59), *V. lisochiloides*.

**S. fasciata** (banded). *fl.* large, few in a spike; sepals and petals white, with yellowish-cinnamon bars inside, cuneate-oblong, acute; lip whitish, the tips of the side plates of the anterior part yellow, and a few purplish spots on the keel of the under side; basilar laciniae nearly dolabriform; peduncles stalked, trigonous. *l.* cuneate-ligulate, obtusely bilobed. Eastern tropical Asia, 1872. *SYN.* *Trichoglottis fasciata*.

**S. gigantea** (gigantic). *fl.* 3in. across; sepals and petals deep yellow, with cinnamon-brown blotches, oblong, obovate; lip white, fleshy, small, incurved, channelled, dolabriform, with short, rounded, basal auricles; racemes axillary, about half as long as the leaves. Spring. *l.* bold, distichous, dark green, broadly lorate, recurved, tough, 1½ in. long, very obtuse, emarginate. Burmah, 1858. A majestic plant. *SYN.* *Vanda gigantea* (B. M. 5139; I. H. 277; R. X. O. ii. 112).

**STAUROSTIGMA** (from *stauros*, a cross, and *stigma*, a stigma; in allusion to the cross or star-shaped stigmas). Including *Asterostigma* and *Rhopalostigma*. *ORD.* *Aroidæ* (*Araceæ*). A small genus (six species) of stove, tuberous, stoloniferous herbs, natives of tropical America. Flowers all perfect, the males and females contiguous; spathe erect, lanceolate, convolute at base, opening or gaping above; spadix monocious, inappendiculate, cylindrical, shorter than the spathe; peduncles many or solitary, equaling the leaves. Leaves on long petioles, hastate-cordate, pinnatisect, or once or twice pinnatifid; pinnae sessile, acuminate. The introduced species are described below. A well-drained compost of sandy loam and peat is most suitable. A season of rest must be allowed, during which the plants should be sparingly watered, so as not to become quite dry. Propagation may be effected by seeds, sown in bottom heat; or by division of the tubers.

**S. concinnum** (neat). *fl.*, spathe narrow-lanceolate, very acute; spadix white and purple, scarcely shorter than the spathe, the male part dense-flowered; peduncle livid-purple, shorter than the petioles. *l.*, young ones reniform, pedatisect, the segments obovate-lanceolate; adults three-parted, the middle part pinnatisect, elongated-oblong, the lateral parts cymosely bi- or trisected; petioles nearly as long as the blades, marked with pale violet and dark purple. *h.* 1½ ft. Brazil, 1860. (L. B. C. 1590, under name of *Caladium luridum*.)

**S. c. colubrinum** (snake-like). *fl.*, spathe greyish-green, marked with red and brownish-purple; spadix pale greenish and dirty-scarlet. Rio Janeiro, 1860.

**S. c. Langsdorffii** (Langsdorff's). *fl.*, spathe glaucous-green outside, livid or dirty-brown within; spadix rose-violet. *l.*, petioles green, more or less conspicuously spotted with white. *h.* 1½ ft. Rio Janeiro, 1860.

**S. c. lineolatum** (lined). *fl.*, spathe greyish-green outside, with ochraceous stripes, brownish-purple within; spadix dirty-yellowish and rose-colour. *h.* 1½ ft. Rio Janeiro, 1860.

**S. Luschianum** (Luschath's). *fl.*, spathe deep green within and speckled with brown, reticulated externally. 2in. to 4in. long, erect, cylindric, acute; spadix cylindric; anthers scarlet; ovaries white; scape similar to the petiole. *l.* 1 ft. to 2 ft. long, deep green, pinnatifid, broadly ovate; two lower segments deflexed, deeply cut into three to five lobes; remaining segments four to six pairs, sessile, remote, irregularly sinuate-lobed or entire; petioles 6in. to 12in. long, whitish, with black-purple streaks. Rio Janeiro. (B. M. 5972, under name of *Asterostigma Luschianum*.)

**S. Riedelianum** (Riedel's). *fl.*, spathe yellowish, greenish outside; spadix slender, one-third shorter than the spathe; peduncles many, variegated. *l.*, adults three-parted; middle part pinnatisect, the segments linear-oblong, sessile, abruptly and rather long-cuspidate at apex; lower lateral ones shortly decurrent; peduncles spotted and variegated, scarcely longer than the blades. *h.* 2 ft. Bahia, 1860.

**STAVESACRE.** See *Delphinium Staphysagria*.

**STEAM, HEATING BY.** A method of heating plant structures, which has been almost or entirely superseded by that of hot water. Most of the systems of heating now adopted in gardens, are described under **Heating** (which see).

**STEEL-BLUE SIREX.** See *Sirex*.

**STEENHAMMERA.** A synonym of *Mertensia* (which see).

**STENOGRAMME.** Included under *Polypodium*.

**STEGOSIA.** A synonym of *Rottboellia* (which see).

**STELEPHUROS.** A synonym of *Phleum* (which see).

**STELIS** (the old Greek name used by Theophrastus for some parasitical plant). *ORD.* *Orchidæ*. A large genus (about 150 species have been described) of stove, epiphytal orchide, inhabiting tropical America, from Brazil and Peru, as far as Mexico and the West Indies. Flowers small, sometimes minute, shortly pedicellate, in terminal, elongated racemes, rarely sub-distichous; sepals spreading, more or less connate; petals much shorter, broad, with thickened margins, often nearly including the column and lip; lip sessile at the base of the column, resembling the petals, or narrowed and occasionally three-lobed; pollen masses two; bracts alternate, often distichous. Leaves coriaceous, often contracted into the petioles. Stems tufted, or creeping with simple branches, one-leaved at apex, often with one to three sheaths below the leaves, not pseudo-bulbous. Few of the species have any attraction on the score of beauty; but many of them are very interesting. A selection of those best known to cultivators is given below. For culture, see **Pleurothallis**.

**S. atropurpurea** (dark purple). A synonym of *S. ciliaris*.

**S. Bruckmülleri** (Bruckmüller's). *fl.* yellowish-purple outside, pale purple within, disposed at intervals of ½ in. along the rachis; sepals broadly ovate, acute, united at base, clothed with spreading hairs within; petals and lips very minute, the latter undivided; racemes two or three times as long as the leaves. December. *l.* 1½ in. to 2 in. long. Probably Mexican Andes. (B. M. 6521.)

**S. canaliculata** (channelled). *fl.* dull yellowish-green, very small, secund, disposed in a dense raceme; bracts and rachis whitish. *l.* cuneate-oblong, obtuse, thick, plainly channelled in the middle. *h.* 8 in. Bogota, 1872.

**S. ciliaris** (ciliated). *fl.* deep purple, with long fringes to the ovate sepals; petals oblate-rhomboid, fleshy; lip ovate, fleshy, channelled at base; spike naked half-way up, then closely covered with flowers. February. *l.* broadly oblong, narrowed at base. *h.* 6 in. Mexico, 1842. *SYN.* *S. atropurpurea* (B. M. 3975).

**S. Endresii** (Endres'). *fl.* greenish-white; sepals coalescing towards the base; lip fleshy, transversely sub-rhomboid, excavated; raceme distichous. December and July. *l.* cuneate, oblong-ligulate, obtuse, emarginate and apiculate, thick. Costa Rica, 1870.

**S. glossula** (small-tongued). *fl.* brownish, standing in two transverse rows, the upper sepal having a much longer extent than the whole of the other organs of the flower together; lip fleshy, papuliform. *l.* cuneate, oblong-ligulate, minutely bilobed, with a small tooth at apex. Costa Rica, 1870. Plant densely tufted.

**S. grandiflora** (large-flowered). *fl.* chocolate-coloured, among the largest of the genus; sepals equal, obtuse; petals ovate; lip ovate, concave, emarginate; spike dense; spathe large, acuminate. July. *l.* oblong, petiolate, emarginate, 4½ in. long, 1 in. broad. Stem 3 in. high. Brazil, 1836.

**S. grossilabris** (large-lipped). *fl.* light greenish, small; lip thick and fleshy; racemes shorter than the leaves. *l.* cuneate, spatulate, obtuse. Native place unknown. 1881. Plant tufted.

**S. micrantha** (small-flowered). *fl.* whitish, red within, nodding, one-sided-distichous; sepals deltoid; petals and lip truncate; raceme slender, spike-formed. April. *l.* lanceolate-oblong, rather blunt, contracted and tapering at base, 1 in. to 2½ in. long. *h.* 3 in. to 6 in. Jamaica, 1805. (H. E. F. 158; L. B. C. 1011; S. E. B. 75.)

**S. ophioglossoides** (Ophioglossum-like). *fl.* greenish, with a tinge of purple, minute; raceme slender, one-sided, pedunculate. September. *l.* 2½ in. to 6 in. long, oblong-linear, rather blunt, long-tapering at the base. Stem shorter than the leaves. West Indies, 1791. (B. R. 935; L. B. C. 442.)

**S. sesquipedalis** (foot-and-a-half). *fl.* pale yellow, secund, large; sepals roundish-ovate, obtuse; petals oblate; lip conformed, cucullate; spike 7 in. to 10 in. long. August. *l.* broadly oval, shortly petiolate, 1½ in. to 4 in. long. *h.* 6 in. Sierra Nevada, 1845.

**S. zonata** (zoned). *fl.* light ochre; sepals brown at the base; petals with a mauve middle zone; raceme one-sided. *l.* very thick, cuneate-oblong, blunt. Stem short. Demerara, 1834.

**STELLARIA** (from *stella*, a star; alluding to the flowers). Starwort; Stitch Grass; Stitchwort. Including *Larrea*, *Malachium*, *Micropetalon*, and *Spergularium*. ORD. *Caryophyllææ*. A genus comprising about seventy species of usually diffuse herbs, broadly dispersed over the globe, seven being natives of Britain. Flowers white, small, in dichotomous cymes; sepals and petals five, rarely four; stamens ten, rarely eight, five, or three. Leaves narrow or broad. *S. media* is the common Chickweed. *S. Holostea* is one of our early hedge-flowers. The species thrive in ordinary soil, but have little value as garden plants.

*S. graminea aurea* (golden grass-like). *fl.* white, many,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. in diameter; petals equalling the three-nerved sepals. May to August. *l.* very narrow, sessile, ciliate, pale golden-yellow. Stem 1 ft. to 3 ft. long, sub-erect, four-angled. (The green-leaved type is found in Europe (Britain), Siberia, Western Asia to the Himalayas.) A perennial, sometimes used in carpet-bedding.



FIG. 530. TOP OF PLANT OF STELLARIA HOLOSTEA.

*S. Holostea* (Holostea). Adder's Meat; Greater Stitchwort; Moon Flower; Satin Flower, &c. *fl.* white,  $\frac{1}{4}$  in. to  $\frac{1}{2}$  in. in diameter, on slender pedicels; petals twice as long as the almost nerveless sepals. April to June. *l.* sessile, connate, lanceolate, 1 in. to 4 in. long, acuminate, rigid, ciliated. Stem 1 ft. to 2 ft. long, decumbent at base, brittle at the nodes, hairy above. Europe (Britain). Perennial. See Fig. 530. (Sy. En. B. 230.)

**STELLATE.** Star-shaped.

**STELLERA** (named in honour of G. W. Steller, 1709-1746, a celebrated Russian botanical collector). ORD. *Thymelæacææ*. A small genus (eight species have been described, but not more than six are really distinct as such) of hardy, perennial herbs, sub-shrubs, or shrubs, natives of Central and Western Asia. Flowers hermaphrodite, sessile at the tips of the branches, capitate or densely spicate; perianth tube cylindrical, at length cut round above the ovary; lobes four, rarely five, spreading; stamens eight, rarely ten. Leaves alternate, flat. It is doubtful whether the under-mentioned species are still cultivated. Both are perennial herbs, thriving in ordinary soil; they may be multiplied by divisions.

*S. altaica* (Altaiian). *fl.* white; lobes four; stamens eight; head ovoid, ten to fifteen-flowered, at length elongated into an oblong,

*Stellera*—continued.

leafless spike, about 1 in. long. July. *l.* lanceolate or oblong, slightly acute, about 1 in. long. Stems slender, many from the rhizome, erect or ascending. *h.* 1 ft. Altai, 1824.

*S. Chamejasme* (ground Jessamine). *fl.* white; lobes five; stamens ten; head six to fifteen-flowered. June. *l.* lanceolate or oblong, slightly acute, five to ten lines long. Stems often numerous from a thick rhizome, slender. *h.* 1 ft. Siberia, 1817.

**STEM.** That part of a plant which supports the leaves and (in flowering plants) the flowers. It is always present in Vascular plants, though occasionally so extremely ill-developed that the plants are called *acaulescent* or stemless; but, in such plants, the top of the so-called root is, in truth, the stem. In the Algae, Fungi, and Lichens there is no real distinction into Stems and leaves, the two being replaced by the thallus. In most plants, the Stem usually rises upwards towards light, contains chlorophyll, is covered with true epidermis, with stomata, and bears leaves and buds at the nodes—standing in marked contrast, in all these points, to roots, though exceptions occur to all of the characters mentioned. Stems vary from  $\frac{1}{2}$  in. or less (*Centunculus minimus*) to 470 ft. in height (*Eucalyptus amygdalina*), and from extreme slenderness (e.g., in *Radiola millegrana*) to the enormous trunks of the Sequoias in Western America, whose girth is many yards.

It would occupy too much space to enter into details of the wide differences in habit met with in Stems, due to variation in thickness, branching (whether with or without a main stem), direction, and many other characters. A reference to the figures under such headings as **Agave**, **Cactus**, **Coreopsis**, **Fragaria**, **Hedera**, **Palma**, **Pinus**, &c., will give a better idea of these differences than any brief description could.

Internal structure of Stems also varies greatly; but there are two well-marked types in woody Stems, after the first year of growth. The one is characteristic of Dicotyledons and Conifers, and the other of Monocotyledons. In the former, there is the appearance, in cross-section, of as many rings of wood as the Stem is years old, due to the wood formed in autumn being closer in texture than that of spring, and therefore differing from it in appearance. There is also a well-marked bark, separated from the wood by a well-developed cambium, or layer, where growth in thickness is effected. In most Dicotyledons there is also pith in the centre of the Stem, and lines of cellular tissue, named medullary rays, run towards the circumference from the girth, and cut the wood into wedge-shaped masses. In the Monocotyledons, on the contrary, the Stems, in transverse section, show no appearance of layers, the bundles of woody fibres lying imbedded amongst cellular tissue, in which no separation into pith and bark is observable. In these Stems there are no annual rings, no medullary rays, no cambium, and no true bark; and the Stem, after it is once formed, does not increase in thickness, but only in length.

Certain forms of Stems have received special names, of which the following are among the more important: **Candex**, applied to the columnar, erect Stems of Palms and Tree-ferns, marked with the bases of the leafstalks, or with their scars; **Culm**, the cylindrical, jointed Stems of Grasses and allied plants, which usually have hollow internodes; **Scape**, a leafless, erect stem, ending in a flower or group of flowers. Decumbent lateral stems, or branches, receive the following names: **Runner**, when slender, lying on the surface of the soil, and emitting roots at the nodes; **Stolon**, resembling a runner, but forming erect Stems from the terminal buds, which tend to form new plants; **Offset**, a short stolon; **Sucker**, an underground stolon.

Stems are occasionally much modified to serve peculiar functions. Among the most remarkable of such modifications are **Spines** and **Tendrils**. The former are branches or main Stems that have remained short, but

**Stem**—continued.

have the woody tissues largely developed, so that they are very strong and rigid, and, ending in sharp points, form an efficient protection against injury from animals. Examples of Stem-spines are seen in the Blackthorn, the Hawthorn, and many other shrubs. Tendrils, in a few plants (e.g., Passion-flower and Vine), are very slender Stems that have the power of twining round firm supports in a continuous spiral from right to left, or from left to right. Twining Stems form a transition between tendrils and ordinary Stems.

**STEMLET.** A diminutive stem.

**STEMMATIUM.** A synonym of **Trietagma** (which see).

**STEMODIA** (from *stemon*, a stamen, and *dis*, double; alluding to the anthers, which consist of two separate cells). **SYN.** *Unanuea*. Including *Matourea*. **ORD.** *Scrophularineæ*. A genus comprising about twenty-six species of stove, greenhouse, or half-hardy, often aromatic herbs, sometimes sub-shrubs, inhabiting tropical and Southern extra-tropical America, tropical Africa and Asia, and Australia. Flowers generally bluish, solitary in the axils, or the upper ones clustered in leafy or bracted spikes; corolla tube cylindrical, the upper lip broad, entire or emarginate, the lower one spreading or three-lobed; stamens four, didynamous; anthers two-celled. Leaves opposite, or in whorls of three or four. Only two species call for description here. These thrive in any rich, moist soil, and may be readily multiplied by division of the roots.

**S. chilensis** (Chilian). *fl.*, corolla nearly twice as long as the calyx, the lower lip glabrous; spikes terminal, leafy, at length elongated and interrupted. September. *l.* oblong or lanceolate, 1 in. to 2 in. long, unequally serrated, acute, cordate-amplexicaul or auriculate at base. Stem above 1 ft. high, branched above. Chili, 1829. Plant very viscous, half-hardy. (B. R. 1470.)

**S. lobelioides** (Lobelia-like). *fl.* of an intense blue; corolla nearly twice as long as the calyx, but smaller than in *S. chilensis*; spikes terminal, somewhat panicle, leafy, at length slightly elongated. August. *l.* oblong-lanceolate, acute, unequally serrated, narrowed towards the base, and often dilated-amplexicaul. *h.* 1 ft. Brazil, 1830. Plant glabrous, half-hardy. (B. M. 3134, under name of *Gratiola tetragona*.)

**STEMONA** (from *stemon*, a stamen; in allusion to the foliaceous stamens). **SYN.** *Roxburghia*. **ORD.** *Roxburghiaceæ*. A small genus (four or five species) of interesting, stove climbers, natives of the East Indies, the Malayan Archipelago, and tropical Australia. Flowers rather large, handsome, but fetid, on axillary, one or few-flowered peduncles; perianth segments four, distinct, biseriate, erect, acuminate; stamens nearly hypogynous. Leaves alternate, lanceolate, ovate, or cordate, rather shining, with thick, transverse veinlets; petioles inarticulate. Perhaps the only species in cultivation is that described below. It thrives in light, turfy loam, and may be readily increased by suckers.

**S. gloriosoides** (Gloriosa-like). *fl.* green, campanulate, glabrous; perianth segments narrow, acuminate; peduncles solitary, racemously one to three-flowered. July. *l.* scattered, very rarely nearly opposite, ovate-lanceolate, loosely cordate, acuminate, slightly mucronate, 4 in. to 6 in. long. *h.* 6 ft. East Indies, 1803. **SYN.** *Roxburghia gloriosa* (B. M. 1500), *R. viridiflora* (S. E. B. 57).

**STEMONACANTHUS.** Included under *Ruellia*.

**STENACTIS SPECIOSA.** A synonym of *Erigeron speciosus* (which see).

**STENANDRUM IGNEUM.** A synonym of *Chamæranthemum igneum*.

**STENANTHERA** (from *stenos*, narrow, and *anthera*, an anther; the filaments are broader than the anthers, which causes the latter to appear narrow). **ORD.** *Epacridææ*. A small genus (two species) of beautiful, greenhouse, evergreen shrubs, now included, by Bentham, under *Astroloma*; both are natives of Australia. Flowers axillary, solitary; corolla tube without tufts of hairs or fringed scales inside; filaments much flattened. Leaves linear, with revolute margins. The species thrive best

**Stenantha**—continued.

in a compost of one-third sandy loam, and two-thirds very sandy peat. The fine roots of the plants are injured by the application of much water; consequently, ample drainage must be provided in the pots. Propagation may be effected by cuttings, taken from the young shoots, and inserted in sand, under a glass, in heat.

**S. ciliata** (ciliated). *fl.* red, almost sessile; sepals obtuse; corolla tube nearly or quite 3 in. long; bracts very small. April. *l.* spreading, linear, tapering into a short point, serrulate-ciliated, convex, with recurved margins, crowded and 3 in. long, or more distant and 4 in. long. Stems prostrate or diffuse. 1836. The correct name of this plant is *Astroloma longiflorum*.

**S. pinifolia** (Pine-leaved). *fl.* sessile and solitary in each axil, but often crowded at the bases of the branchlets; bracts several, inner ones 3 in. to 4 in. long; corolla about 3 in. long, reddish at base, passing into yellow, with green tips. May. *l.* crowded, very narrow-linear, rigidly pointed, with revolute, scabrous margins, about 3 in. long. *h.* 2 ft. to 3 ft. (or small and diffuse). 1811. (B. R. 218.)

**STENANTHIUM** (from *stenos*, narrow, and *anthos*, a blossom; alluding to the narrow perianth segments and panicles). **ORD.** *Liliaceæ*. This genus embraces five species of greenhouse or hardy, bulbous plants, of which one is a native of North-west Asia, and the rest are North American. Flowers racemose or paniculate, often nodding, pedicellate; perianth whitish, greenish, or dark purple, narrowly or broadly campanulate, the segments connate in a very short, turbinate tube, spreading above, narrow or lanceolate; stamens six; bracts small or minute. Leaves radical or at the base of the stem, long, linear or linear-lanceolate. Stem erect, tall, simple except the inflorescence, sometimes furnished with a few small leaves. Only three species call for mention here. They thrive in a mixture of sandy loam and peat, and may be increased by division. All are North American.

**S. angustifolium** (narrow-leaved). *fl.* greenish-white, the lower ones often sterile, nearly sessile; perianth about 3 in. in diameter; panicle 1 ft. to 2 ft. long, 3 in. to 4 in. broad, composed of simple, spiked racemes. June and July. *l.* channelled, 1 ft. to 2 ft. long. Stem 2 ft. to 3 ft. high. Hardy.

**S. a. gramineum** (Grass-like). *fl.* fewer than in the type. *l.* narrower. **SYN.** *Helonias graminea* (B. M. 1599).

**S. frigidum** (frigid). *fl.* perianth purplish, 3 in. to 3 in. long; racemes lateral, ascending, few-flowered; panicle loose, 1 ft. long. June. *l.* radical ones five or six, firm, linear, acute, glabrous, 2 ft. long. Stem 2 ft. to 3 ft. high, with a few reduced leaves. 1846. Hardy. (F. d. S. 468; J. H. S. i. 32.)

**S. occidentale** (Western). *fl.* dark purple, somewhat resembling those of a Hyacinth, campanulate, disposed in a loose raceme. Summer. *l.* two to four, linear. Stem slender, furnished with a few reduced leaves. 1881. Hardy. (R. G. 1035, f. 3, and 1132, f. 1.)

**STENIA** (from *stenos*, narrow; alluding to the form of the pollen masses). **ORD.** *Orchidææ*. A small genus (three species) of stove, epiphytal orchids, natives of Guiana, Columbia, and Peru. Flowers rather large; sepals of equal length, spreading, the lateral ones rather broader, adnate at base to the foot of the rather thick, erect column; petals similar to the dorsal sepal; lip continuous with the foot of the column, fleshy, broad, nearly saccate, the lateral lobes small, the middle one undivided, or all broader and fimbriate, the disk crested; pollen masses four, oblong-linear; scapes short, recurved, one-flowered. Leaves oblong or narrow, coriaceous. Stems shortened. Pseudo-bulbs clustered, one or two-leaved. For culture, see **Maxillaria**.

**S. fimbriata** (fringed). *fl.* light yellow, membranous, marked at the base of the elegantly-fringed lip with brownish-purple dots; peduncles erect. *l.* cuneate-oblong, acute. Columbia, 1869. **SYN.** *Chondrorhyncha fimbriata* (Ref. B. 107).

**S. guttata** (spotted). This species is closely related to *S. pallida*, but differs in having blunter sepals and petals, with spots of purple on a straw-coloured ground, and in the lip being blotched and having only seven callous teeth. Peru, 1880.

**S. pallida** (pale). *fl.* pale citron-colour, 1½ in. or more in diameter; sepals and petals linear, acute; lip spotted with red, saccate, entire, fleshy, ovate; scapes radical, prostrate. August to October. *l.* two to five, oblong, acute, slightly narrowed and keeled at base, sheathed with brownish, spathaceous scales. Stem wanting. Demerara, 1837. (B. R. 1838, 30.)

**STENOCARPUS** (from *stenos*, narrow, and *karpus*, a fruit; alluding to the usually nearly flat follicles). *SYNS.* *Agnostus*, *Cybele*. *ORD.* *Proteaceæ*. A genus comprising fourteen species of stove or greenhouse trees, of which three are Australian and the rest New Caledonian. Flowers yellow, white, or red, umbellate, hermaphrodite, slightly irregular; perianth tube elongated, opening along the lower side; limb sub-globose, recurved, the segments at length separating; anthers sessile within the concave lamina; bracts small and highly caducous, or absent. Leaves alternate or scattered, entire or deeply pinnatifid with few lobes. Only three of the species have been introduced. For culture, see **Lomatia**.

**S. Cunninghamii** (Cunningham's). A synonym of *S. sinuatus*.

**S. Forsteri** (Forster's). *fl.* white; perianth four to five lines long; pedicels longer than the perianth; umbels solitary, six to eight-flowered; peduncles terminal, equalling the leaves. June. *l.* oblong, obtuse, attenuated and slightly petiolate, entire, ten to eighteen lines long, three to six lines broad, almost veinless. Branches terete; branchlets slender. *h.* 3ft. New Caledonia, 1850. (*L.* & *P.* F. G. ii. p. 166.)

**S. salignus** (Willow-like). Beef Wood. *fl.* greenish; perianth usually under  $\frac{1}{2}$  in. long; pedicels  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, irregularly crowded; peduncles slender, terminal or in the upper axils, usually shorter than the leaves, bearing a single umbel of ten to thirty flowers. June. *l.* ovate-lanceolate or elliptic, acute, acuminate, or rarely obtuse,  $\frac{2}{3}$  in. to  $\frac{4}{5}$  in. long, tapering into short petioles. *h.* 5ft. or more. Australia, 1719. (*B. R.* 441.)

**S. sinuatus** (sinuate).\* Fire-tree or Tulip-tree of Queensland. *fl.* bright red; perianth tube  $\frac{1}{2}$  in. or more long, straight, tapering upwards; peduncles terminal,  $\frac{2}{3}$  in. to  $\frac{4}{5}$  in. long, each bearing an umbel of twelve to twenty flowers, and either generally umbellate or shortly racemose. June. *l.* petiolate, either undivided, oblong-lanceolate, and  $\frac{6}{8}$  in. to  $\frac{8}{10}$  in. long, or pinnatifid and above  $\frac{1}{2}$  in. long, with one to four oblong lobes on each side. *h.* (in Australia) 60ft. to 100ft. 1830. *SYN.* *S. Cunninghamii* (*B. M.* 4263; *F. d. S.* iii. 7; *P. M. B.* xiv. 1).

**STENOCHILUS** (from *stenos*, narrow, and *cheilos*, a lip; alluding to the narrow lip of the flower). *ORD.* *Myoporinææ*. A genus comprising eight species of pretty, little, greenhouse, evergreen, Australian shrubs, now included, by the authors of the "Genera Plantarum," under *Eremophila*. Calyx segments five, imbricated at base, usually enlarged after flowering; four upper lobes of corolla short and acute, the fifth lowest more deeply separated and sometimes narrow; stamens four (with one exception), exserted. Leaves alternate or scattered. The two best-known species are here described. They thrive in sandy peat, and may be increased by cuttings, inserted in sand, under a glass.

**S. glaber** (glabrous). *fl.* yellow, red, or with these colours variously mixed; corolla glabrous, or slightly pubescent outside, nearly or quite  $\frac{1}{2}$  in. long, the tube constricted above the ovary; pedicels solitary. April. *l.* lanceolate, or rarely elliptic-oblong or cuneate, acute or obtuse, entire or slightly serrulated, usually  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long. *h.* 3ft. 1803. (*B. M.* 1942; *B. R.* 572.) *SYNS.* *S. incanus*, *S. viscosus* (*B. M.* 2930). The correct name of this plant is *Eremophila Brownii*.

**S. incanus** (hoary). A synonym of *S. glaber*.

**S. maculatus** (spotted). *fl.* red, more or less variegated with yellow, or quite yellow, solitary; corolla  $\frac{1}{2}$  in. or more long, the lowest lobe separated to below the middle. April. *l.* mostly lanceolate, occasionally varying from elliptic-oblong to linear, acute or obtuse, entire, above  $\frac{1}{2}$  in. long. *h.* 3ft. 1820. (*B. R.* 647.) The correct name of this plant is *Eremophila maculata*.

**S. viscosus** (clammy). A synonym of *S. glaber*.

**STENOCHLÆNA**. Included under *Acrostichum* and *Lomatia*.

**STENOCORYNE** (from *stenos*, narrow, and *koryne*, a club; alluding to the club-shaped spur of the lateral sepals). *ORD.* *Orchideæ*. A monotypic genus. The species is a stove, epiphytal orchid, now regarded, by Bentham and Hooker, as a member of the genus *Bifrenaria*. For culture, see **Maxillaria**.

**S. longicornis** (long-horned). *fl.* orange, spotted with brown; lateral sepals ovate, acute, extended into a long, slender, clavate spur; *l.* long, unguiculate, three-lobed at apex; raceme loose, many-flowered. April. *l.* oblong-lanceolate, sub-plicate, shining. Pseudo-bulbs elongated, tetragonal. *h.* 1ft. Demerara, 1843.

**STENOGASTRA**. Included under **Sinningia** (which see).

**STENOGLOSSUM** (from *stenos*, narrow, and *glossa*, a tongue; alluding to the long, narrow labellum). *ORD.* *Orchideæ*. A monotypic genus. The species is a stove, epiphytal orchid, having racemose flowers and narrow leaves, allied to *Epidendrum*. It is a native of the Andes of tropical America, and is not yet known to cultivation in this country.

**STENOGLOTTIS** (from *stenos*, narrow, and *glotta*, a tongue; alluding to the narrow lip). *ORD.* *Orchideæ*. A monotypic genus. The species is a greenhouse, terrestrial orchid, allied to *Habenaria*. It thrives in a compost of loam and rotten leaves, with the addition of small pieces of decayed wood and charcoal. The temperature of an intermediate house is most suitable. Water must be plentifully supplied during the growing season. Propagation may be effected by division.

**S. fimbriata** (fringed). *fl.* rosy-pink, rather small, scattered on a slender spike, sub-second; sepals free, sub-equal, at length spreading; petals similar, but smaller; lip spreading from the column, narrow, as long as the sepals, trifid at apex, not spurred; column very short. *l.* clustered at the base of the stem, oblong. Root tuberous, or consisting of fascicled, fleshy fibres. South Africa, 1871. (*B. M.* 5872.)

**STENOLOMA**. Included under **Davallia** (which see).

**STENOMESSON** (from *stenos*, narrow, and *messon*, middle; alluding to the shape of the perianth). Including *Callithauma*, *Chrysiphiala*, *Clitanthus*, *Coburgia*, *Nevea*, and *Spherothele*. *ORD.* *Amarylidææ*. This genus comprises, according to Mr. Baker, nineteen species of stove or greenhouse, bulbous plants, natives of tropical America. Flowers many in an umbel, very rarely reduced to one, often on pendulous, recurved pedicels; perianth red, orange, or fulvous, showy; tube elongated, sub-cylindrical, often slightly contracted above the base or towards the middle; lobes sub-equal, erect or more or less spreading; stamens erect, connected on a six-toothed corona; involucre bracts two, broad or narrow. Leaves appearing with the flowers, linear or rather broad, loriform. Except where otherwise indicated, the under-mentioned species require greenhouse heat. For culture, see **Hippeastrum**.

**S. aurantiacum** (orange). *fl.* nodding; perianth yellow, the segments ovate, erect; stamens included; bracts shorter than the pedicels; umbels two-flowered. May. *l.* ligulate, with revolute margins. *h.* 1ft. Quito, 1843. (*B. R.* 1844, 42, and *R. H.* 1883, p. 396, under name of *S. Hartwegii*.)

**S. coccineum** (scarlet).\* *fl.* four to eight in an umbel, drooping; perianth bright crimson,  $\frac{1}{2}$  in. long, the oblong-lanceolate segments half as long as the tube; scape 1ft. or more high, firm, terete. May. *l.* four or five, 1ft. or more long, moderately fleshy. Peruvian Andes, 1850. (*Ref.* *B.* 309.) *SYN.* *Coburgia coccinea* (*B. M.* 3865).

**S. croceum** (yellow). *fl.* nearly erect, four in an umbel; perianth golden,  $\frac{1}{2}$  in. long, the tube curved, the limb segments connivent; bracts  $\frac{1}{2}$  in. long, marcescent; scape 1ft. long, terete, glaucous. May. *l.* linear-lanceolate or oval-lanceolate, solitary, green above, whitish beneath. Peru, 1820. (*B. M.* 2641, under name of *S. flavum* *B. R.* 778, under name of *Chrysiphiala flava*.)

**S. curvidentatum** (curved-toothed). *fl.* shortly pedicellate; perianth golden, pale greenish below,  $\frac{1}{2}$  in. long, curved, the segments reflexed, obtuse; coronal teeth recurved; bracts  $\frac{1}{2}$  in. long, marcescent; scape terete,  $\frac{6}{8}$  in. long, two-flowered. May. *l.* lanceolate-oval, compressed, sub-acute. Peru, 1842. (*B. M.* 2640.)

**S. Hartwegii** (Hartweg's). A synonym of *S. aurantiacum*.

**S. humilis** (dwarf). *fl.*, perianth scarlet, nearly  $\frac{3}{4}$  in. long, the tube cylindrical, enlarged above, the limb somewhat spreading; scape one-flowered. March. *l.* green, glabrous, shining, sub-acute, slightly channelled, nearly 1ft. long, and about  $\frac{1}{2}$  in. broad. Cordillera, 1841. *SYN.* *Coburgia humilis* (*B. R.* 1842, 46).

**S. incarnata** (flesh-coloured).\* *fl.* very shortly pedicellate; perianth variable in colour, usually red, nearly  $\frac{5}{8}$  in. long, glabrous, the segments ovate-elliptic, slightly obtuse, spotted, nearly  $\frac{1}{2}$  in. long; scape four or five-flowered, erect, about 2ft. high. August. *l.* linear, narrowed above, obtuse, entire, succulent, reticulate-nerved, glabrous, erect, 1ft. long,  $\frac{1}{2}$  in. broad. Quito, 1826. (*R. G.* 1147.) *SYN.* *Coburgia incarnata* (*S. B. F. G.* ser. ii. 17). The following so-called species are regarded, by Mr. Baker, as "apparently only, in a broad sense, varieties differing principally in the colour of the flower":

**S. i. fulvum** (fulvous). *fl.*, perianth tawny,  $\frac{4}{8}$  in. long; bracts persistent; scape above 2ft. long. *l.* about six, linear-ligulate,



**Stenomesson**—continued

1½ ft. or more long. *SYN. Coburgia fulva* (B. M. 3221; B. R. 1497).

**S. i. trichrochum** (three-coloured). *fl.*, perianth tube scarlet, 4½ in. long, slightly curved; limb segments green above the middle, paler within. *l.* glaucous, obtuse, sub-erect. *SYN. Coburgia trichrochum* (B. M. 3367 and 5686).

**S. i. versicolor** (various-coloured). *fl.*, perianth varying in colour from scarlet to whitish-fulvous, the lower part curved, lin. long, the upper part ventricose, 1½ in. long; limb lin. long, the segments acute, spotted with green outside, whitish within. *l.* 2½ ft. long, 2 in. broad. *SYN. Coburgia versicolor* (B. R. xviii. 66).

**S. latifolium** (broad-leaved). *fl.* shortly pedicellate, nearly erect; perianth orange-yellow, the tube cylindrical-infundibular, the segments spreading-recurved; scape umbellately five-flowered, green. March. *l.* petiolate, lanceolate-oblong, acuminate, narrowed from the petioles, striate-nerved. *h.* 1 ft. Lima, 1837. Stove. (B. M. 3803.)

**S. luteo-viride** (yellowish-green). *fl.* five or six in an umbel, on very short pedicels; perianth tube greenish-yellow, cylindrical, 2 in. to 3 in. long, the segments yellow, with a distinct, green keel, lin. long; corona green, ½ in. long; scape 1½ ft. long. Spring. *l.* about four, linear-lorate, glabrous, 1 ft. long, lin. broad, narrowed gradually to the point. Andes, 1878. (B. M. 6508.)

**S. pauciflorum** (few-flowered). *fl.* two to an umbel, one sessile, the other pedicellate, nearly erect; perianth yellow, nearly 2 in. long, contracted above the middle, the segments green at back, concave, lanceolate, rigid; stamens exserted; scape glaucous. May. *l.* lanceolate, narrowed at both ends, petiolate. *h.* 1 ft. Peru, 1822. *SYN. Chrysiphiola pauciflora* (H. E. F. 132).

**S. Pearcei** (Pearce's). *fl.* six to eight in an umbel; perianth greenish-yellow, cernuous, funnel-shaped, the segments primrose-yellow, tinged externally with green, oblong, erecto-patent; pedicels 2 in. to 4 in. long; scape 2½ ft. to 3 ft. high, firm, slightly compressed. May. *l.* lorate-lanceolate, 1½ ft. long, narrowed gradually upwards to an acute point, and downwards into a flattened petiole 2 in. to 3 in. long, the edges rather revolute. Andes of Bolivia, 1872. (Ref. B. 308.)

**S. Stricklandi** (Strickland's). *fl.* five or six in an umbel; perianth bright red, the segments longer than the tube. Spring. *l.* petiolate, oblong-lanceolate. Andes of Ecuador, 1882.

**S. suspensum** (suspended). *fl.* four to six, drooping, on pedicels about 1 in. long; perianth bright scarlet, 1½ in. long, the tube half its length, the divisions ½ in. deep; spathe two-leaved, 1½ in. long; scape firm, erect, naked, 1 ft. high. May. *l.* two, linear, acute, 1 ft. long, ½ in. broad, fleshy. Peru, 1865. (Ref. B. 22.)

**S. viridiflorum** (green-flowered). *fl.*, perianth green, very pretty; peduncle short; bracts marcescent, deciduous; scape erect, 6 ft. high, terete, smooth. May. *l.* long, flat, ensiform, about ½ in. broad, erecto-patent, diverging. Peru, 1839. *SYN. Callithauva viridiflorum* (B. M. 3866).

**S. vitellinum** (yolk-of-egg-coloured).\* *fl.* on short pedicels, six in an umbel; perianth yellow, with erect segments; stamens exserted; scape 7 in. long, glaucous. April. *l.* obovate-oblong, three-nerved, petiolate, recurved at the margins, glaucous beneath. *h.* 1 ft. Lima, 1842. Stove. (B. R. 1845, 2.)

**STENOPTERA** (from *stenos*, narrow, and *pteron*, a wing; alluding to the linear, contracted inner segments of the perianth). *SYN. Porphyrostachys*. *ORD. Orchidæ*. A small genus (three species) of stove, terrestrial orchids, natives of the mountains of tropical America. Flowers showy or mediocre, in a dense or slender spike. Leaves clustered at the base of the stem. The species are unknown to cultivation.

**STENORHYNCHUS**. Included under *Spiranthes* (which see).

**STENOS**. This term, used in Greek compounds, signifies narrow; e.g., *Stenophyllum*, narrow-leaved.

**STENOSEMI**. Included under *Acrostichum* (which see).

**STENOSOLENIUM**. A synonym of *Arnebia*.

**STENOSPERMATION** (from *stenos*, narrow, and *spermatum*, a diminutive of *sperma*, a seed; in allusion to the slender seeds). *ORD. Aroidæ* (*Araceæ*). A genus consisting of about seven species of stove herbs or subshrubs, natives of tropical America. Flowers all hermaphrodite; spathe navicular, convolute, at length opening, wholly deciduous; spadix long-stipitate, inappendiculate, much shorter than the spathe, cylindrical; peduncle terminal, straight. Leaves distichous, coriaceous, lanceolate, acuminate; petioles short or elongated, sometimes sheathing along their whole length. Caudex elongated, creeping, or rooting at the nodes. *S. pompayanense*, the only

**Stenospermation**—continued.

species introduced, requires culture similar to *Spathiphyllum* (which see).

**S. pompayanense** (Pompayan). *fl.*, spathe ivory-white, boat-shaped, long-cuspidate; spadix suffused with white, about 2 in. long. *l.* elliptic-oblong or oblong-lanceolate, slightly obtuse at base; petioles half to three-quarters the length of the blades, sheathed above the middle. Caudex ascending. *h.* 1 ft. Pompan Andes, 1875. Evergreen perennial. *SYNS. S. Wallisii* (B. M. 6334 and G. C. 1875, 116-7), *Spathiphyllum Wallisii*.

**S. Wallisii** (Wallis'). A synonym of *S. pompayanense*.

**STENOSTOMUM**. A synonym of *Stenostomum* (which see).

**STENOSTOMUM** (from *stenos*, narrow, and *stoma*, a mouth; alluding to the shape of the flowers). *SYNS. Stenostemum*, *Sturmia*. *ORD. Rubiaceæ*. A small genus (about five species) of pretty, small, stove, evergreen trees, natives of the West Indies, now included, by Benth and Hooker, as a section of the genus *Antirrhæa*. Flowers white, small, cymose; calyx five-toothed; corolla funnel-shaped, five-lobed; stamens five; peduncles axillary. Leaves opposite, oval or oblong, shortly petiolate; stipules at length deciduous. For culture of the two species introduced, see *Hamiltonia*.

**S. lucidum** (clear). *fl.* distant; peduncles once or twice bifid below or at the middle. May. *l.* elliptic or elliptic-oblong, chartaceous, 2 in. to 3 in. long, blunt, shining-glabrous. 1818. A small tree.

**S. tomentosum** (tomentose). *fl.* distant; peduncles rather exceeding the leaves, once or twice bifid about the middle. May. *l.* elliptic, 3 in. to 4 in. long, glabrous above, velvety-tomentose beneath. 1822. A small tree.

**STENOTAPHRUM** (from *stenos*, narrow, and *taphros*, a trench; referring to the cavities in the rachis in which the spikelets are seated). *SYN. Diastemanthe*. *ORD. Gramineæ*. A small genus (two or three species) of stove, creeping, radiant grasses, inhabiting tropical regions, mostly near the sea. Spikelets usually two or four together in very short spikes, embedded in the alternate notches of the broad rachis of a spike-like panicle, the rachis of the partial spike usually produced into a short point beyond the insertion of the spikelets, and the common rachis often disarticulating transversely between the notches when old; glumes four; inflorescence terminal. Leaves flat or convolute, spreading. *S. americanum*, the only species in cultivation, is a curious, perennial grass, thriving in a light, loamy soil. It may be increased by seeds, or by divisions.

**S. americanum** (American). Australian Buffalo Grass. *fl.*, spikes solitary and terminal, 2 in. or more long, the rachis flat and flexuous, readily disarticulating transversely between the notches when old. *l.* obtuse, flat or involute, the sheaths usually broad and flat, ciliated at the orifice. Stems somewhat flattened. *h.* about 1 ft. Tropical regions, &c. *SYN. S. glabrum*.

**S. a. variegatum** (variegated).\* *l.* 2 in. to 4 in. long, blunt, freely striped with creamy-white. 1874. An excellent basket plant. This is probably the plant catalogued by some nurserymen as *Stephanophorum glabrum variegatum*.

**S. glabrum** (glabrous). A synonym of *S. americanum*.

**STEPHANANDRA** (from *stephanos*, a crown, and *aner*, *andros*, a male; alluding to the disposition of the stamens). *ORD. Rosaceæ*. A monotypic genus. The species is a hardy, deciduous shrub, allied to *Spiræa* (which see for culture).

**S. flexuosa** (flexuous). *fl.* white, small, disposed in corymbose panicles or racemes, slenderly pedicellate, erecto-patent; calyx lobes and petals five, the latter spatulate. July. *l.* alternate, petiolate, incised, or pinnatifid and incised-serrate, pubescent beneath; stipules leafy, persistent. Branches slender, distichous, flexuous. Japan, 1870.

**STEPHANIA** (named in honour of Professor Frederick Stephan, of Moscow, who died in 1817). *SYN. Clypea*. *ORD. Menispermaceæ*. A small genus (three species) of stove or greenhouse climbers, natives of tropical Africa or Asia, or tropical and sub-tropical Australia. Flowers dioecious, disposed in simple or compound umbels; males with six to ten, females with three to five, sepals. Leaves usually peltate. The species introduced require similar treatment to *Morisonia* (which see).



**Stephania**—*continued*.

**S. hernandifolia** (Hernandia-leaved). *fl.* in capitate umbels, on short or long, axillary peduncles; petals three or four; rays eight to twelve, with subulate bracts. June. *l.* ovate or sub-deltoid, acute, obtuse, or acuminate at apex, truncate or sub-cordate at base, 3in. to 6in. in diameter, glabrous or thinly pubescent below or on both surfaces; petioles  $\frac{1}{2}$ in. to 4in. long. India.

**S. rotunda** (round-leaved). *fl.* orange; umbels loosely cymose. June. *l.* broadly ovate or nearly round, irregularly sinuate-lobed or repand, glabrous, on long petioles. Himalayas, 1866. Greenhouse.

**STEPHANIA** (of Willdenow). A synonym of **Steriphoma** (which see).

**STEPHANIMUM**. A synonym of **Palicourea** (which see).

**STEPHANOCOMA** (from *stephanos*, a crown, and *kome*, hair; referring to the crown-like pappus). **ORD. Compositæ**. A monotypic genus. The species is a greenhouse, Thistle-like herb, requiring culture similar to **Berkheya** (which see).

**S. carduoides** (Thistle-like). *fl.*-heads yellow, discoid, small, at the tips of the branches, corymbose; involucre scales shorter than the disk, in many rows, subulate, margined with solitary, slender spines. Autumn. *l.* sparsely setulose, or glabrous on both sides, spiny-toothed or lobed, long-decurrent. Stem erect, striate, sub-glabrous. *h.* 2½ft. South Africa, 1864. (B. M. 5715, under name of *Stobæa sphaerocephala*.)

**STEPHANOLIRION**. A synonym of **Tristagma** (which see).

**STEPHANOMERIA** (from *stephanos*, a crown, and *meris*, a part; a name of no particular application). **SYN. Jamesia** (of Nees). **ORD. Compositæ**. A genus comprising about eight species of hardy, glabrous, annual or perennial herbs, natives of North-west America. Flower-heads pink and white, radiate, sometimes terminal and erect, sometimes fasciated at the sides of the branches; ray florets ligulate, truncate five-toothed at apex. Leaves alternate, narrow, entire, remotely toothed, runcinate-pinnatifid, or the cauline ones reduced to short scales. Stems erect, simple or divaricately branched. Probably none of the species are now grown in this country.

**STEPHANOPHORUM GLABRUM VARIEGATUM**. See **Stephanophyllum americanum variegatum**.

**STEPHANOPHYSUM**. Included under **Ruellia** (which see).

**STEPHANOTIS** (from *stephanos*, a crown, and *ous, otos*, an ear; alluding to the auricles of the staminal crown). **SYN. Jasminanthus**. **ORD. Asclepiadææ**. A genus comprising about fourteen species of glabrous, twining, often tall-climbing, stove shrubs; five are found in Madagascar, five in the Malayan Archipelago and South China, three in Cuba, and one in Peru. Flowers white, large, simple, in umbelliform cymes; calyx five-parted, the segments somewhat leafy; corolla salver-shaped or nearly funnel-shaped, the tube cylindrical, broader at the base, and dilated at the throat, the limb of five twisted lobes; coronal scales five, erect, often free at apex. Leaves opposite, coriaceous. Only two of the species have been introduced. *S. floribunda* is a beautiful and very popular, stove plant, because of its fragrant, pure white blossoms, which are produced in great profusion. It succeeds best in turfy loam, and may be increased by cuttings of the

**Stephanotis**—*continued*.

previous year's growth, inserted singly in pots, in spring, and placed in a close frame with a temperature of 60deg. Established plants do best when placed in a bed of prepared soil, about 3ft. square, and the growths trained to a trellis beneath the roof. *S. Thouarsii* thrives under similar treatment.

**S. floribunda** (bundle-flowered).\* Clustered Wax Flower; Madagascar Chaplet Flower; Madagascar Jasmine. *fl.* of the purest white, highly fragrant, borne freely in large bunches; sepals ovate, obtuse, one-fourth as long as the corolla tube; segments of the corolla ovate-oblong; coronal scales ovate, shorter than the anthers; peduncles short, scarcely equalling the petioles. May. *l.* oval or ovate-elliptic, ample, of great substance, retuse or very shortly uncinately-acuminate. *h.* 10ft. Madagascar, 1839. See Fig. 531. (B. v. 203; B. M. 4058; G. C. n. s., xiv. p. 169; P. M. B. xi. 29.) The Elvaston variety is a compact-growing, floriferous form (G. C. n. s., xiv., p. 169.)

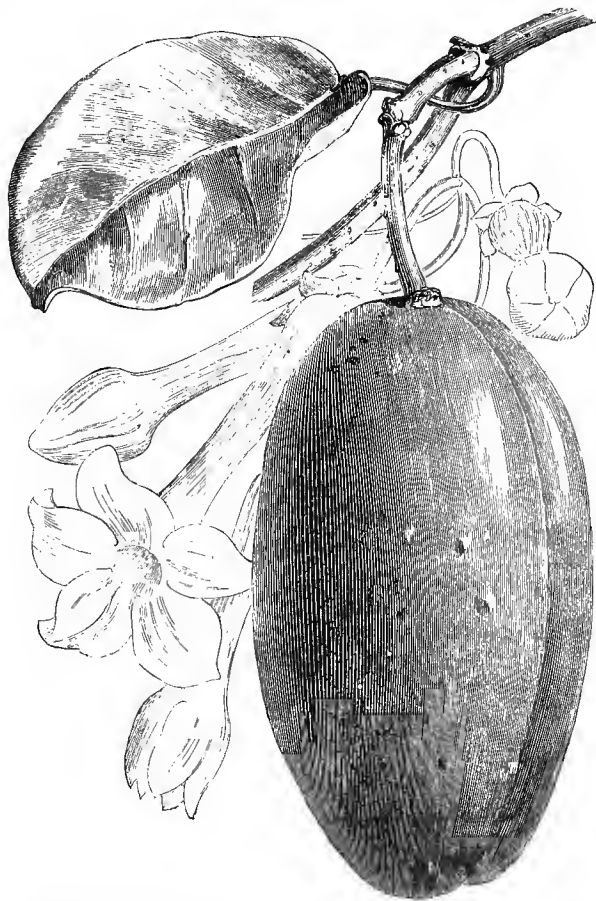


FIG. 531. FRUITING BRANCH, AND PORTION OF INFLORESCENCE, OF **STEPHANOTIS FLORIBUNDA**.

**S. Thouarsii** (Thouars'). *fl.*, sepals ovate-lanceolate, one-third the length of the corolla tube; coronal scales lanceolate, exceeding the anthers; peduncles equalling the petioles, three-flowered. May. *l.* obovate or obovate-oblong, shortly acuminate. *h.* 10ft. Madagascar, 1842.

**STEPS**. In gardens, these are best constructed of stone, which should be of a description suitable for withstanding frost and exposure to all weathers. Steps are necessary for affording a means of entering glass houses, when the latter are situated above the ground level, and for passing from one terrace walk to another, when the ground is too steep or inconveniently situated for forming a slope instead.

Folding Steps, made of wood, and hinged at the top,

**Steps**—continued.

are very valuable for standing upon in places where a ladder cannot be used. Two pairs of folding Steps, with a plank resting on their tops, make a good movable stage for the use of workmen engaged in clipping high hedges, &c.

**STERCULIA** (from *Sterculus*, a god, derived from *stercus*, dung; the flowers and leaves of some of the species are foetid). Including *Brachychiton* (kept distinct in this work), *Delabechea*, *Ivira*, and *Southwellia*. ORD. *Sterculiaceæ*. Of this genus, about sixty species have been described as such, but probably not more than fifty are really distinct; they are stove or greenhouse, evergreen trees, inhabiting the warmer regions of the globe, being most plentiful in tropical Asia. Flowers paniculate or rarely racemose, the inflorescence usually axillary; calyx five-cleft or five-parted, rarely four-parted, often coloured; petals wanting; staminal column bearing at the summit fifteen (or rarely ten) stamens. Leaves undivided, lobed, or digitate. The species introduced, a selection of which is given below, succeed in a light, loamy soil, or a compost of loam and peat. Ripened cuttings, with the leaves intact, will readily root in sand, under a hand-glass; those of the stove species require a moist heat.

**S. Balanghas** (Balanghas). *f.* purplish, panicled; calyx segments linear, five-cleft to the middle, the segments connivent. June to September. *l.* elliptic-oblong, rather blunt, entire, nearly smooth. *h.* 30ft. Malabar and East Indies, 1787. Stove.

**S. Bidwilli** (Bidwill's). The correct name of plant described in this work as *Brachychiton Bidwilli*.

**S. discolor** (discoloured).\* *f.* in terminal, contracted, spicate panicles; calyx rose-red, rusty-tomentose, 1½ in. long, between campanulate and funnel-shaped. *l.* long-petiolate, 5 in. to 7 in. long and broad, pale green, cordate or bilobed at base, with a broad or narrow sinus, more or less deeply five-lobed, but never beyond the middle. *h.* 40ft. West Australia, 1882. Greenhouse. (B. M. 6608.)

**S. diversifolia** (variable-leaved). Bottle-tree of Victoria. The correct name of plant described in this work as *Brachychiton diversifolium*.

**S. Ivira** (Ivira). *f.* yellowish, with spreading segments, in panicles; carpels bristly. July. *l.* ovate, smooth, acuminate at the apex, entire, rarely three-lobed. *h.* 20ft. to 60ft. South America, 1793. Stove.

**S. lanceolata** (lanceolate-leaved). *f.* reddish-brown, stellate, in small, axillary panicles; calyx segments spreading, not cohering at base; racemes simple. Summer. *l.* quite entire, smooth, ovate-lanceolate. *h.* 20ft. China. Greenhouse. (B. K. 1256.)

**S. macrophylla** (large-leaved). *f.* yellow; calyx five-cleft, with spreading segments; panicles lateral, drooping. July. *l.* deeply cordate, obtuse, undivided, tomentose beneath. East Indies, 1822. A large, stove tree.

**S. platanifolia** (Plane-leaved). Chinese Parasol. *f.* panicled. *l.* large, highly glabrous, cordate, three to five-lobed; lobes



FIG. 532. FRUITS AND LEAF OF *STERCULIA RUPESTRIS*.

**Sterculia**—continued.

terminating in an acute point, the sinuses rounded; petioles terete. China. A tall, greenhouse tree.

**S. pubescens** (downy). A synonym of *S. tragacanthæ*.

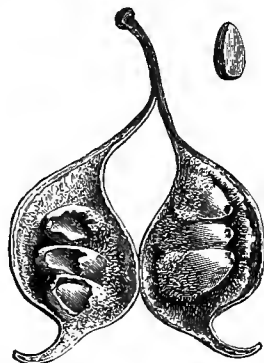


FIG. 533. DEHISCING FRUIT AND SEED OF *STERCULIA RUPESTRIS*.

**S. rupestris** (rock-loving). Bottle-tree. *f.* calyx campanulate, deeply lobed; panicle tomentose, usually longer than the petioles. Summer. *l.* glabrous, either quite entire, oblong-linear or lanceolate, 3 in. to 6 in. long, or digitate, of five to nine sessile leaflets, often above 6 in. long. Australia, 1880. A good-sized, greenhouse tree, the trunk often swelling to a large size—hence the common name. See Figs. 532 and 533. SYN. *Delabechea rupestris*.

**S. tragacanthæ** (tragacanth). Tragacanth Gum-tree of Sierra Leone. *f.* red-brown; calyx segments equalling the turbinate tube; panicle axillary, coarctate, tomentose. Summer. *l.* ovate, acute, obtuse at base, tomentose beneath. *h.* 20ft. Guinea, 1793. Stove. (B. R. 1353.) SYN. *S. pubescens*.

**S. villosa** (villous). *f.* calyx downy outside, pinkish within; style recurved; panicle compound, pendulous. June. *l.* five to seven-lobed, acuminate, velvety-tomentose beneath. *h.* 15ft. East Indies, 1805. Stove.

**STERCULIACEÆ.** A natural order of usually soft-wooded herbs, shrubs, or trees, mostly inhabiting tropical and sub-tropical regions. Flowers regular, hermaphrodite or unisexual; calyx gamosepalous, usually persistent, more or less deeply five-cleft, rarely four or three-cleft, the lobes valvate; petals five, hypogynous, free or adnate at base with the staminal tube, often marcescent-persistent, twisted-imbriate, or wanting; stamens very variable; inflorescence axillary or rarely terminal, racemose or cymose-paniculate, or rarely reduced to a solitary flower. Fruit dry or rarely baccate. Leaves alternate, or very rarely nearly opposite, sometimes simple, pinninerved or palm-nerved, entire, toothed, or lobed, sometimes digitately three to nine-foliolate; stipules at the bases of the petioles, very rarely wanting. *Sterculiaceæ* contain an abundant mucilage, combined, in the old bark of the woody species, with a bitter, astringent matter, and are emetics and stimulants. The dried and split cotyledons of the seeds of *Theobroma Cacao* are called cocoa nibs, and, when ground and made into a paste, chocolate. The seeds comprise, among other properties, a fixed and solid oil, known as cocoa butter. The order embraces about forty-six genera, and 520 species. These are classified, by the authors of the "Genera Plantarum," under seven tribes: *Buettneriæ*, *Dombeyæ*, *Eriolaneæ*, *Helicteræ*, *Hermannieæ*, *Lasiopetaleæ*, and *Sterculiæ*. Illustrative genera are: *Buettneria*, *Cola*, *Commersonia*, *Helicteres*, *Lasiopetalum*, *Sterculia*.

**STEREOSANDRA** (from *stereos*, rigid, and *aner*, andros, a male or anther; in reference to the upright stamen). ORD. *Orchideæ*. A monotypic genus. The species is a stove, terrestrial, leafless orohid, bearing a loose raceme of shortly-pedicellate, medium-sized flowers. It is a native of Java, and has not been introduced to cultivation in this country.

**STEREOXYLON.** A synonym of *Escallonia*.

**STERIGMA** (from *sterigma*, a fork; the larger stamens are connected at the base and forked at the top). SYN. *Sterigmotemon*. ORD. *Crucifera*. A genus comprising five species of hardy, robust, perennial herbs, natives of Asia Minor, Persia, the Caspian region, and Siberia. Flowers yellow, rather large, in elongated, ebracteate racemes; sepals sub-erect; pedicels rather thick, spreading. Leaves entire or pinnatifid. One or two of the species have been introduced, but they are now probably lost to cultivation.

**STERIGMA**. A term applied to any foliaceous prolongation of the blade of a leaf down on the stem by decurrence.

**STERIGMOSTEMON**. A synonym of *Sterigma* (which see).

**STERILE**. Barren. A male or staminate flower is commonly said to be sterile.

**STERIPHOMA** (from *steriphoma*, a foundation; in allusion to the large fruit-stalk). SYNS. *Romeria* (of Trattinick), *Stephania* (of Willdenow). ORD. *Capparidæ*. A small genus (three species) of stove, unarmed shrubs, natives of Peru, New Grenada, Venezuela, and the Trinity Islands. Flowers orange, showy; calyx two or four-lobed at apex, irregularly ruptured; torus very short; petals four, sessile; stamens six; racemes terminal; peduncles thick; pedicels thickened at the apex, inflexed or recurved, one-flowered. Leaves long-petiolate, one-foliate; leaflet lanceolate, entire; petiole thickened at the apex. The only species introduced is well worth cultivating on account of the beauty of its flowers. It thrives in a compost of equal parts loam, peat, and sand. Cuttings should be taken from young wood, inserted in a pot of sand, and plunged in heat, under a hand glass.

**S. cleomoides** (Cleome-like). \* fl. with a reddish-brown calyx and yellow petals and stamens. April to July. l. oblong-lanceolate, much acuminate, scarcely longer than the footstalks. h. 6ft. Caracas, 1823. SYN. *S. paradoxum* (B. M. 5788; F. d. S. 554-5; L. & P. F. G. i. 73, p. 107.)

**S. paradoxum** (paradoxical). A synonym of *S. cleomoides*.

**STERIS**. Now included under *Hydrolea* (which see).

**STERNBERGIA** (named in honour of Count Caspar Sternberg, 1761-1838, a celebrated botanist). Mount Etna Lily. Including *Oporanthus*. ORD. *Amaryllidæ*. Of this genus, about twelve species have been described, but, according to Mr. Baker, not more than four are distinct as such; they are hardy, bulbous plants, inhabiting Eastern Europe and the Mediterranean region. Flower often solitary; perianth funnel-shaped, straight, with a short or rather long tube, and linear or lanceolate, equal, erecto-patent lobes; stamens equally affixed at the throat or the bases of the lobes; bracts membranous, hyaline, tubular at base; scape short, sometimes very short, solid. Leaves late or cotemporary with the flowers. Bulb tunicated. *S. lutea* is a popular and valuable plant, on account of its yellow flowers being produced in autumn. The genus may be divided into two sections, viz., *Sternbergia* proper, having autumnal flowers, with a cylindrical tube, and leaves produced in spring; and *Oporanthus*, with short-tubed, funnel-shaped flowers, produced, with the leaves, in October. To the first section belong *S. colchiciflora*, *S. macrantha*, and *S. Schubertii*. *S. lutea* and its forms comprise the second section. Only a couple of species call for mention here. They succeed best in soil of a good depth, and in a sheltered position. The bulbs may be placed from 4in. to 6in. below the surface when planting.

**S. colchiciflora** (Colchicum-flowered). fl. sessile, erect, odorous; perianth tube yellowish-white, straight, partly subterranean, five to nine lines long; limb yellow, erecto-patent, lin. to 1½in. long, the segments striate-nerved; scape subterranean, one-flowered. Autumn. l. produced in spring, rarely in autumn, usually five,

*Sternbergia*—continued.

erect, twisted, carinate, obtusely callous, 4in. long, one line or more broad. Hungary and Roumelia, 1816. (B. R. 2008.)

**S. lutea** (yellow).\* Winter Daffodil; Yellow Star Flower. fl., perianth yellow, 1½in. to 2½in. long, turbanate-campanulate; tube straight, funnel-shaped; segments slightly concave, obtuse or emarginate, twelve to seventeen lines long; scape 2in. to 4in. long. Autumn. l. five, six, or more, arcuate-reflexed, linear-lanceolate, obtusely carinate, canaliculate, obtuse, dark green, 6in. to 12in. long, four to six lines broad. Central Europe, 1596. See

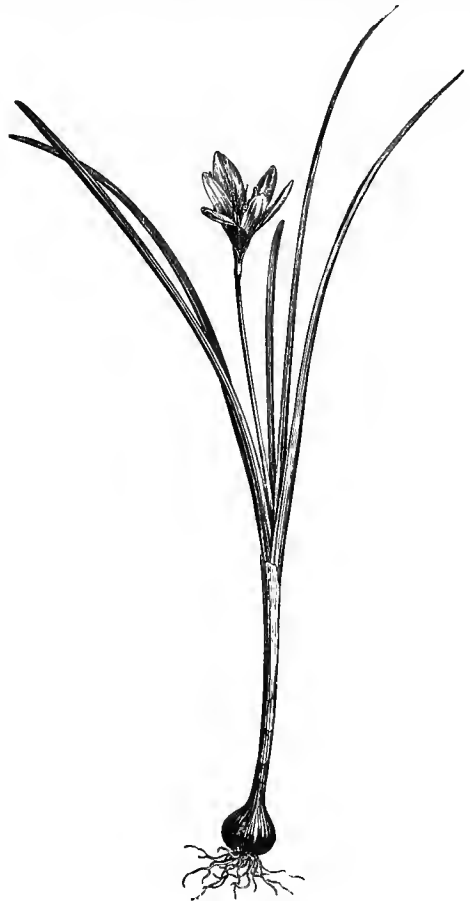


FIG. 534. STERNBERGIA LUTEA.

Fig. 534. SYN. *Amaryllis lutea* (B. M. 290; S. F. G. 310). This plant is supposed to be the "Lily of the Field," of Scripture. The following, often classified as species, are regarded, by Mr. Baker as mere varieties:

**S. l. exigua** (mean). fl. erect; perianth tube campanulate, with equal segments; scape lin. long. l. one to three, short. North Africa, 1820.

**S. l. Fischeriana** (Fischer's). fl. pale yellow; perianth scarcely 1½in. long; scape 5in. long, mostly underground. Spring. l. erect, loriform, quite flat. Karabagh, 1866. (R. G. 576, under name of *S. Fischeriana*.)

**S. l. græca** (Grecian). A form with short peduncle, leaves short at flowering period, finally 4in. to 5in. long by ½in. broad. Greece.

**S. l. sicula** (Sicilian).\* A variety bearing larger flowers, with more acute, narrower perianth segments. Sicily.

**STEUDERIA** (of Sprengel). A synonym of *Erythronium*.

**STEUDNERA** (named after Dr. Steudner, of Gorlitz, a German botanist). ORD. *Aroidæ* (*Araceæ*). A small genus (three or four species) of stove, herbaceous perennials, natives of Burmah. Flowers all perfect, dense, the females much shorter than the males; spathe opening,

**Staudnera**—continued.

very shortly convolute at base, ovate-lanceolate, at length reflexed above the middle, marcescent; spadix much shorter than the spathe, part of the back female flowers adnate; peduncle short. Leaves long-petiolate, peltate, ovate-oblong, emarginate at base. Caudex thick, elongated, ascending, membranous-sheathed. *S. colocasiaefolia* and its variety are the only members of this genus yet introduced. These thrive in a soil composed of rich, sandy loam, leaf mould, and bits of broken charcoal, well mixed and drained. A moist atmosphere is desirable, and a resting period necessary. Propagation may be effected by suckers, by cuttings, or by division of the rootstock.

**S. colocasiaefolia** (*Colocasia*-leaved). *fl.*, spathe yellowish, more or less dark purple within, becoming recurved so as to expose the spadix, which is whitish, one-third as long as the spathe, and erect. *l.* of an obscure green above, paler beneath; petioles sometimes of a somewhat violet colour. Stems short, thick, fleshy. 1869. (I. H. n. s. 90; R. G. 653.)

**S. c. discolor** (two-coloured). *fl.*, spathe yellow on both surfaces, the base reddish-purple. *l.* marked between the primary veins above with a series of broad, brownish-purple blotches. *h.* 1 ft. 1874. (B. M. 6076 and F. d. S. 2201, under name of *S. colocasiaefolia*.)

**STEVENIA**. Included under *Arabis*.

**STEVENSONIA** (named after Stevenson, formerly Governor of the Island of Mauritius and its dependencies). *SYN. Phœnicophorium*. *ORD. Palmæ*. A monotypic genus. The species is a noble, stove Palm. It thrives in a hot, moisture-laden atmosphere, and suffers if the temperature falls too low, or the air becomes dry. The mixture best adapted for it is a well-drained, fibrous peat, with pieces of charcoal and turfy loam and sand intermixed. Propagated by means of imported seeds.

**S. grandifolia** (large-leaved).\* *fl.*, lower spathes 1½ ft. long, the upper ones club-shaped, smooth, 2 ft. to 3½ ft. long; spadix 3 ft. to 6 ft. long; peduncle 1½ ft. to 3 ft. long, compressed at base. *fr.* orange-red, ½ in. to ¾ in. long. *l.* cuneate-obovate, bifid, oblique at base, deeply lacinated down the side, with incised segments; petioles 9 in. to 18 in. long, glabrous, pale green, convex below; sheaths 2 ft. to 3 ft. long, hoary, scaly, and spiny. Stem very spiny when young, less so when old. *h.* 40 ft. Seychelles, 1865. *SYNS. Areca sechellarum, Astrocaryum Borsionyanum* and *A. pictum* (all of gardens), *Phœnicophorium sechellarum* (I. H. 435).

**STEVIA** (named after Peter James Esteve, M.D., Professor of Botany at Valencia, in the sixteenth century). *ORD. Compositæ*. A genus of stove, greenhouse, or hardy herbs or sub-shrubs, rarely diffuse. More than 100 species have been described by various authors, but the number may be reduced; they inhabit the warmer parts of America. Flower-heads white or purplish, paniculate or corymbose; involucre cylindrical; bracts five or six; receptacle flat, naked; florets five, equal, regular, five-cleft, tubular; achenes narrow; pappus palea or bristles two or many. Leaves opposite, or the upper ones alternate, often triple-nerved and serrated, sometimes tri-sect or entire. The under-mentioned species are rather pretty, perennial herbs, and, except where otherwise stated, all succeed in the open flower-border, in summer. The protection of a frame is necessary in severe weather. Propagation may be effected by seeds, by cuttings, or by divisions.

**S. brevilaristata** (short-awned). *fl.*-heads of a beautiful rose-colour, disposed in a dense corymb; florets with a long tube and a limb of five spreading segments; pappus of three rather strong, rigid crowns, short. July. *l.* opposite, nearly glabrous, coarsely serrated, attenuated, but not petiolate; upper ones lanceolate. Branches downy. *h.* 2 ft. to 3 ft. Tucuman, 1836. Stove. (B. M. 3792.)

**S. Eupatoria** (Hemp Agrimony-like). *fl.*-heads in fastigate, rather loose corymbs; florets white, flesh-coloured in the tube, twice as long as the involucre. August. *l.* lanceolate, somewhat attenuated into the petioles, three-nerved, the upper ones obsoletely serrated. *h.* 1½ ft. Mexico, 1826. (B. M. 1849.) *SYN. S. punctata*.

**S. fascicularis** (fascicled). A synonym of *S. rhombifolia*.

**S. hyssopifolia** (Hyssop-leaved). A synonym of *S. paniculata*.

**S. ivæfolia** (Iva-leaved). A synonym of *S. serrata*.

**S. ovata** (ovate-leaved). *fl.*-heads white, in rather compact, fastigate corymbs. August. *l.* ovate, serrated, cuneate at base,

**Stevia**—continued.

entire; upper ones oblong, sub-entire. Stem erect, paniculate. *h.* 2 ft. Mexico, 1816.

**S. paniculata** (paniculate). *fl.*-heads white, the tubes of the ray florets, which are longer than the involucre, purplish; peduncles slightly branched, three or four-headed, corymbose. August. *l.*, lowest ones opposite, ovate; upper ones alternate, ovate-oblong, serrated, cuneate at base, entire, the uppermost ones linear-lanceolate. Stem erect, shortly pubescent, paniculate. *h.* 1½ ft. Mexico, 1824. (B. M. 1861, under name of *S. hyssopifolia*.)

**S. pedata** (pedate-leaved). *fl.*-heads loosely corymbose; involucre purplish; florets white, all tubular; anthers dark purple. July to September. *l.* alternate, pedate, generally seven-cleft; leaflets linear, quite entire, with revolute margins; petioles channelled, trifid. Stem erect, branched towards the top. *h.* 1 ft. Mexico, 1803. (B. M. 2040.) The correct name of this plant is *Florestina pedata*.

**S. pubescens** (downy). *fl.*-heads purple; involucre pubescent; pappus paleaceous; corymbs fastigate, rather dense. August. *l.*, lower ones opposite, sub-spathulate, toothed at apex, attenuated into the petioles; upper ones scattered, linear, sub-entire. Stem simple, somewhat erect, pubescent. *h.* 1½ ft. Mexico, 1823.

**S. punctata** (dotted). A synonym of *S. Eupatoria*.

**S. purpurea** (purple). *fl.*-heads purple, in slightly coarctate corymbs; involucre pale greenish; pappus paleaceous and three-awned. August. *l.* lanceolate, alternate; lower ones obovate, channelled, narrowed into the petioles, serrated at apex. Stem erect, velvety-pubescent, much-branched. *h.* 1½ ft. Mexico, 1812. (B. R. 93, under name of *S. Eupatoria*.)

**S. rhombifolia** (rhomb-leaved). *fl.*-heads white or yellow and white, rarely red, in fascicles at the tips of the branches. September. *l.*, lower ones rhomboid-ovate, crenate-serrated; upper ones often alternate, narrower, and more entire. *h.* 1½ ft. Mexico, 1827. (B. R. xxiv. 59, under name of *S. fascicularis*.)

**S. serrata** (saw-edged). *fl.*-heads white or pink, in fastigate corymbs; pappus bristly, two or often three-awned. August. *l.* alternate, somewhat fascicled, linear-lanceolate, slightly glabrous, serrated, entire at base and attenuated into the petioles. Stem erect, branched, pubescent. *h.* 1½ ft. Mexico, 1827. *SYN. S. ivæfolia*.

**S. tracheloides** (Throatwort-like). *fl.*-heads purple; involucral scales downy, mucronate-acuminate; pappus crown-like, very short; corymbs clustered, many-headed. August. *l.* of the lower branches opposite, cuneate at base or entire, sessile; the rest broadly ovate, slightly acute, deeply crenate-serrate, hairy on both sides. Stem erect, densely velvety-pubescent. *h.* 2½ ft. Mexico, 1839. Greenhouse. (B. M. 3856.)

**STEWARTIA**. See *Stuartia*.**STIBASIA**. Included under *Marattia*.

**STICHUS**. A term which, used in Greek compounds, denotes a rank or row: e.g., Distichous, two-ranked.

**STICKMANNIA**. A synonym of *Dichorisandra* (which see).

**STIFFTIA** (so called after A. J. Stiff, 1760-1836, Imperial Physician in Austria). *SYNS. Aristomenia, Augusta, Sankhilaria*. *ORD. Compositæ*. A genus comprising four or five species of stove, glabrous trees and shrubs, natives of Brazil or Guiana. Flower-heads yellow or orange, large and solitary or few together, or smaller and paniculate; involucral bracts in many series, imbricated, obtuse, appressed, the outer ones gradually shortening; receptacle naked, foveolate; florets tubular, with a limb of five, narrow, revolute lobes; achenes elongated; pappus bristles in many series. Leaves alternate, coriaceous, entire. *S. chrysantha* is a fine, showy, evergreen shrub, requiring a well-drained, turfy loam, and a light, airy situation. It is propagated by cuttings of the young wood, inserted in sandy soil, under a bell glass, in bottom-heat.

**S. chrysantha** (golden-flowered). *fl.*-heads orange-colour, 2 in. in diameter, solitary; florets indefinite; pappus saffron-colour. February to April. *l.* lanceolate, acuminate. *h.* 6 ft. Brazil, 1840. (B. M. 4438.)

**STIGMA** (from *stigma*, a mark; in allusion to the Stigma being a mark or spot on the style). That part of the pistil of a flower which is fitted to receive the pollen when mature, and to permit the passage of pollen tubes for the fertilisation of the ovules. It is peculiar

**Stigma**—*continued*.

in having its surface covered with long cells, attached loosely by one end to the cells below, with the other end free. These cells secrete a sticky fluid, which retains the pollen grains when they touch it, and also stimulates them to emit tubes (*see Pollen*). The tubes can readily pass in between the loosely-arranged cells of the Stigma, and then down the loose "conducting tissue" of the style and ovary. The Stigma has no epidermis upon it, in which it differs from all other parts of flowering plants. It is usually situated on the tip or along one side of the style; or the latter may be absent, in which case the Stigma is situated on the tip of the ovary. It may be displaced from this position by inequality of growth in the two sides of the ovary. Each carpel has a Stigma; but where two or more carpels are closely united, the Stigmata may also be so united as to appear like one. In those flowers that are pollinated by wind (*e.g.*, Grasses), the Stigma is frequently covered with long, spreading hairs; while in those pollinated by insects, and in cleistogamous flowers, the Stigma is usually small, and confined to the tip of the style, or to a narrow line on one side of it.

**STIGMAPHYLLON** (from *stigma*, and *phyllon*, a leaf; alluding to the stigmas being expanded into a sort of leaf). ORD. *Malpighiaceæ*. A genus comprising about fifty species of handsome, stove, climbing shrubs, natives of tropical America. Flowers yellow; calyx five-parted, eight-glanded; petals unguiculate, unequal, glabrous; stamens ten, unequal, six being perfect; corymbs umbelliform, on axillary and terminal branchlets or peduncles; pedicels minutely bracteate at base, articulated and bibracteolate below the middle. Leaves generally opposite, of two forms, entire or denticulate, rarely lobed; petioles biglandular; stipules minute. The species best known to cultivation are described below. They will grow in a mixture of loam, leaf soil, and peat, with the addition of some sharp sand. Cuttings, made from ripened wood, will root freely if inserted in sandy soil, under a hand glass, in heat, taking about three or four weeks to do so.

**S. aristatum** (awned). *fl.*, petals fimbriated; umbels pedunculate, few-flowered. June to August. *l.*, cauline ones glabrous, sagittate-bastate, angled, acute; those on the younger branchlets often oblong, entire; petioles biglandular at apex. *h.* 15ft. Brazil, 1832. (B. R. 1669.)

**S. ciliatum** (ciliated)\*. Golden Vine. *fl.* large, three to six in an umbel; petals fringed, with long claws. October. *l.* opposite, cordate, oblique at the base, smooth, ciliated, glaucous. Brazil, 1796. A tall climber. (P. M. B. xv. 77.)

**S. diversifolium** (variable-leaved). *fl.*, pedicels articulated at the base. June. *l.* shining above, pubescent or tomentose beneath, ovate or oblong-linear, rounded or almost cordate at base; petiolar glands close to the leaf. West Indies, 1826. Lofty climber.

**S. fulgens** (brilliant). *fl.* borne on divided peduncles. Summer. *l.* glabrous above, silvery beneath with silky down, cordate-rounded, mucronulate, repand, entire; basilar sinus open; petioles biglandular a little below the top. West Indies, &c., 1759. Tall climber.

**S. heterophyllum** (variable-leaved). *fl.* several to an umbel, on solitary, axillary peduncles; sepals erect; petals orbicular. December. *l.* opposite, mostly ovate, waved, entire, very obtuse, mucronate; sometimes broader, almost cordate, deeply three-lobed; lobes oblong, obtuse, mucronate, the side ones spreading. Buenos Ayres, 1842. Tall climber. (B. M. 4014.)

**S. jatrophæfolium** (Jatropha-leaved). *fl.*, petals fimbriated, shell-shaped; umbel many-flowered. Summer. *l.* palmately five to seven-cleft or parted, acute, serrate-ciliated, cordate, clear light green; petioles biglandular at apex. *h.* 6ft. Uruguay, 1841. (B. R. xxx. 7.)

**S. littorale** (shore-loving)\*. *fl.* on pedicels  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; corolla  $\frac{1}{2}$  in. in diameter; claw of the petals longer than the sepals; peduncles axillary, solitary, many-flowered; corymbs terminal, simple or compound. Autumn. *l.* opposite and alternate, long-petiolate,  $\frac{2}{3}$  in. to  $\frac{5}{8}$  in. long, varying in shape. South Brazil, 1882. A tall, leafy climber. (B. M. 6623.)

**STIGMAROTA**. A synonym of **Flacourtia** (which *see*).

**STIGMATIC, STIGMATOSE**. Relating to the stigma.

**STIGMATIFEROUS**. Stigma-bearing.

**STIGMATOID**. Stigma-like.

**STILAGINEÆ**. Included under *Euphorbiaceæ*.

**STILBEE**. A tribe of *Verbenaceæ*.

**STILLINGFLEETIA**. A synonym of **Sapium** (which *see*).

**STILLINGIA** (named in honour of Dr. Benjamin Stillingfleet, 1702-1771, an eminent English botanist). ORD. *Euphorbiaceæ*. Thirteen species have been referred to this genus; they are stove or greenhouse, glabrous shrubs, inhabiting North and South America, the Mascarene and Pacific Islands. Flowers monœcious, apetalous; males often three under a bract, sub-sessile; females solitary under the lower bracts, sessile or very shortly pedicellate, few in a spike, or the spike sometimes all males; spikes terminal, simple; bracts short and broad, biglandular. Leaves alternate or rarely opposite, shortly petiolate, entire or glandular-denticulate. *S. sebifera*, the Tallow-tree of China, the proper name of which is *Euxecaria sebifera*, is the only species calling for mention here; it yields a hard wood, used by the Chinese for wood engravings; tallow is extensively obtained from the seeds, and the leaves are employed for dyeing black.

**STINGING BUSH**. A common name for *Jatropha urans*.

**STINKING GLADWYN**. A common name for *Iris fetidissima*.

**STIPA** (from *stipe*, a silky or feathery substance; alluding to the inflorescence). Including *Lasiagrostis* and *Macrochloa*. ORD. *Gramineæ*. A large genus (nearly 100 species) of stove, greenhouse, or hardy, tall or rarely dwarf, perennial grasses, widely distributed over tropical and temperate regions. Spikelets one-flowered, narrow, paniculate, the rachis of the spikelet articulated above the lower glumes; glumes three, narrow, keeled, the two outer ones usually persistent; panicle terminal, often slender, slightly branched. Leaves convolute-terete or rarely flat. A selection from the few introduced hardy species is given below. With the exception of *S. elegantissima*, all are hardy. *S. pennata*, the well-known Feather Grass of gardens, is a very ornamental plant. Stipas thrive in any ordinary soil, and may be increased by seeds or by divisions.

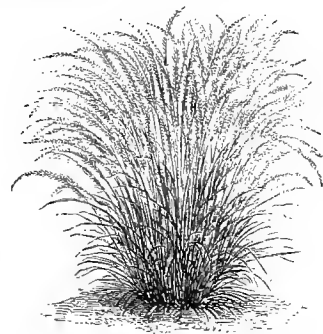


FIG. 535. STIPA PENNATA.

**S. elegantissima** (very elegant). *fl.*, panicle very loose, 6 in. to 8 in. long, at length broadly spreading; the rachis and long, filiform branches elegantly plumose with fine, spreading hairs. *l.* narrow, mostly erect, convolute when dry. Stems from a horizontal rhizome, erect and branching, 2ft. to 3ft. high. Australia. Greenhouse.

**S. gigantea** (gigantic). *fl.*, glumes subulate, much longer than the perianth; perianth  $\frac{1}{2}$  in. long, naked above; bristles slightly

**Stipa**—continued.

twisted, flexuous, very slenderly pubescent, five times longer than the glumes. *h.* 3ft. Spain, 1823.

**S. juncea** (Rush-like). *fl.*, glumes subulate, one-third longer than the perianth, the lower ones slightly larger; perianth nearly five lines long, naked above; bristles twisted, plicate, pilose, six times longer than the glumes; anthers bearded. *h.* 3ft. South-west Europe, 1772.

**S. Lasiagrostis** (*Lasiagrostis*). \* *fl.* shortly stipitate; spikelets one-flowered; glumes two, exceeding the flowers; panicle thickened,

**Stipa**—continued.

**S. tenacissima** (very tenacious). Esparto Grass. *fl.* stipitate; palea membranous, the lower one bifid at apex; panicles spicate, branched, clustered or divaricate. *l.* convolute, filiform. South Europe. A tall grass. SYN. *Macrochloa tenacissima*.

**STIPE** (from *stipes*, a stalk). A term used in various senses, viz.: 1. The erect, cylindrical stem of a Palm or of a Tree-fern, bearing the persistent leafstalks, or the leaf-scars; in this sense it is equal in meaning to "caudex."



FIG. 536. *ERYTHRINA INDICA* PARCELLI, showing Glandular Bodies in place of Stipels.

branched, diffuse. *l.* flat. Culm often branched. South Europe. Plant tall, erect, showy. SYN. *Lasiagrostis Calamagrostis*.

**S. pennata** (feathery). \* Feather Grass. *fl.*, glumes more than double the length of the perianth, the lower ones rather larger; perianth more than  $\frac{1}{2}$  in. long, naked above; bristles twisted, plicate, plumed above, eight times longer than the glumes; anthers naked. *h.* 2ft. Europe (said to have been found in Britain, but this is doubtful). This plant has been long grown in gardens: according to Gerarde, the ladies used to wear the beautifully feathered beards as feathers. See Fig. 535.

2. A prolongation of the floral axis between any two whorls of a flower, *e.g.*, between the calyx and corolla (as in *Silene*), when it is better called "Anthophore," or between the stamens and pistil (as in *Geum rivale*), forming a "Gynophore," or, when the fruit is ripe, a "Carpophore." 3. The stalk that supports the pileus or cap of **Mushrooms** (which see). 4. The leafstalk in Ferns.



**STIPELLATE.** Furnished with stipels.

**STIPELS.** Small bodies, like diminutive stipules, situated at the base of each leaflet in certain compound-leaved plants (e.g., *Phaseolus*), but solitary, except that there are two at the base of the terminal leaflet. Leaflets in such leaves are said to be "stipellate." In some plants, e.g., *Erythrina* (see Fig. 536), Stipels are replaced by small, glandular bodies.



FIG. 537. GARDEN VARIETY OF PEA, showing Stipules resembling Leaflets in appearance and in use.



FIG. 538. FLOWERS, LEAF, AND LEAFLET-LIKE STIPULES OF LOTUS JACOBÆUS.

**STIPITATE.** Having a stipe, or stalk, which is neither a petiole nor a peduncle.

**STIPITIFORM.** Stalk-like; shaped like a stipe.

**STIPULACEOUS, STIPULAR.** Belonging to stipules.

**STIPULATE.** Possessing stipules.

**STIPULES** (from *stipula*, an upright leaf). Bodies, almost always two in number, and quite alike, situated one at each side of the base of each leaf, in many flowering plants, and in one or two Ferns. Stipules vary much in appearance and size; but the two sides of each are unlike one another. They often resemble leaflets, e.g., in Pea (see Fig. 537), and in *Lotus* (see Fig. 538), and are free from everything but the stem. In these cases, they do the work of leaflets; and they may even wholly replace the leaves in their action on gases, the leaves serving other uses—e.g., tendrils in *Lathyrus Aphaca* (a



FIG. 539. ROSE-LEAF, showing Adnate Stipules.

British weed). In many plants, e.g., Rose (see Fig. 539), the Stipules are small, and are fixed along each side of the base of the leafstalk (this arrangement is called "adnate"); in others, they resemble bud-scales, and serve the same purpose as the latter organs, protecting the



FIG. 540. BRANCHLET OF FAGUS SYLVATICUS, showing Stipules resembling Bud Scales.

tender structures in buds, e.g., Beech (see Fig. 540), Oak. In a few plants, Stipules of each pair are united, and form a single body, opposite the leaf (*Platanus*), or between it and the stem (*Potamogeton*), or form a sheath or "ochrea" around the stem (*Polygonum* and *Rumex*). In the genus *Galium*, they are so like the true leaves that the latter are distinguished only by having the buds in their axils; and the Stipules and leaves together resemble a whorl of true leaves. Frequently, Stipules are so small as to be readily overlooked; and in a good many plants they fall off early, and may thus not be

**Stipules**—*continued*.

detected. They are very constantly present in certain classes of plants; hence, their presence and their nature afford important characters in the definition of many natural orders. In many orders, they are not constantly met with, and in many others do not occur at all.

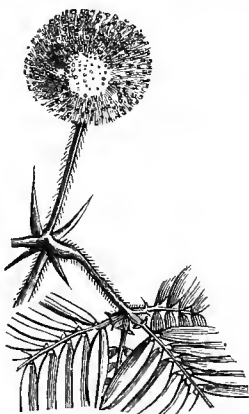


FIG. 541. FLOWER-HEAD AND LEAF OF *MIMOSA PUDICA*, showing Stipules metamorphosed into Spines.

Occasionally, *e.g.*, *Mimosa* (see Fig. 541), they are metamorphosed into spines.

**STIRPS.** A race, or permanent variety; *e.g.*, the Red Cabbage.

**STITCHWORT**, or **STITCH GRASS.** See *Stellaria*.

**STIZOLOBIUM.** A synonym of *Mucuna* (which see).

**STOBÆA.** Included under *Berkheya*.

**STOCK.** The portion of a stem to which a graft is applied; a caudex, rhizome, or root-like base of a stem, from which roots proceed; the term is also used to denote a race.

**STOCK, CAPE.** A common name for *Heliophila* (which see).

**STOCKS** (*Mathiola*). Stocks are well-known and very popular plants with every class of cultivators, because of their beauty for flowering in pots and in the open border, and of the sweet perfume which their flowers emit. There are several distinct classes or types, all of which have been greatly improved, in course of time, by florists and seedsmen in this country and on the Continent. The different types may readily be divided into Summer and Winter Stocks, the former embracing the whole of the Ten-weeks varieties, and the latter the Brompton, East Lothian, and Intermediate types.

The greater portion of the Ten-week Stock seed is imported annually from the Continent, in spring. It is well to divide the supply, and sow a part towards the end of March, and the rest during April; the least heat from fermenting material is of great help in assisting and hastening germination. So soon as the seedlings appear above ground, plenty of air must be given during favourable weather, and water should be carefully applied, as damping and mildew generally prove very destructive sources of evil. If either commence an attack, the best thing is to prick off all the uninjured plants, about 3 in. apart, in new soil. Advantage should be taken to transfer Stocks from a frame into the open border during showery weather; it cannot be done very successfully at any other time, unless the plants have been

**Stocks**—*continued*.

prepared in small pots. The soil for Stocks can scarcely be too rich; it should, therefore, be well dug and manured; and a top-dressing of leaf mould or short manure is also of great benefit in affording nourishment, and preventing evaporation during dry weather. Summer Stocks are not generally grown in pots; they form good beds outside, when the plants succeed, and their flowers are excellent for cutting.

Of Winter Stocks, the most extensively cultivated are the Intermediate and the East Lothian Intermediate; the latter succeeds well in Scotland. The Brompton Stocks are very vigorous; they flower about May and June, and the seed should be sown nearly a year in advance, or not later than the early part of July. It is always safer to preserve a quantity of plants in cold frames during winter, than to place them outside; they usually suffer more from excessive moisture than from cold. Stocks intended for flowering in pots, should be inserted singly, in small thumbs, early in autumn, and plunged in ashes, in a cold frame. When sufficiently established, and in need of more space, they should be transferred into 5 in. pots; this is generally done late in autumn, or early in the following spring, when the double and single-flowered plants can be distinguished from each other. The Intermediate and East Lothian varieties should be selected for cultivating in pots in preference to the Brompton; they have a branching yet compact habit, and flower profusely. The soil used for potting should be of a loamy description, with nearly one-fourth of sifted old mortar intermixed. When the plants are growing, plenty of water is requisite, and manure water is of great help when the flower-buds are developing. Stocks kept in frames through winter, for planting into outside borders, should be transferred to their permanent quarters during March, or as soon afterwards as the weather is considered favourable for their well-being.

*Saving Seed for Producing Double Flowers.* The following remarks are extracted from the appendix to Dr. M. T. Masters' classical work, "Vegetable Teratology," published by the Ray Society in 1869. The reader is also referred to a leading article in the "Gardeners' Chronicle," 1866, p. 74, and to a separate work by Mons. E. Chate, "Traité des Giroflées." The last-named author observes that the gardeners of Erfurt "have, for a long time, to a certain extent, monopolised the sale of seeds of these plants. To obtain these seeds, the Erfurt gardeners cultivate the flowers in pots, and place them on shelves, in large greenhouses, giving them only sufficient water to prevent them from dying. So cultivated, the plants become weakened, the pods shortened, and the seeds less numerous, and better ripened; and these seeds give from sixty to seventy per cent. of double flowers. The seeds from these plants are said to be mostly of an abnormal shape, which is so striking that experienced cultivators are able to separate those which would furnish double flowers from those which would produce single ones."

M. Chate's method, which he calls the French one, gives still greater results, viz.: eighty per cent. of double flowers, and these produced by very simple means. "When my seeds," he observes, "have been chosen with care, I plant them, in the month of April, in good dry mould, in a position exposed to the morning sun, this position being the most favourable. At the time of flowering, I nip off some of the flowering branches, and leave only ten or twelve pods on the secondary branches, taking care to remove all the small weak branches which shoot at this time. I leave none but the principal and secondary branches to bear the pods. All the sap is employed in nourishing the seeds thus borne, which give a result of eighty per cent. of double flowers. The pods, under this management, are thicker, and their maturation is more perfect. At the time of extracting the seeds, the upper portion of the pod is

**Stocks**—*continued*.

separated and placed aside, because it has been ascertained that the plants coming from the seeds situated in this portion of the pod give eighty per cent. of single flowers. They yield, however, greater variety than the others. This plan of suppressing that part of the pod which yields single flowers in the largest proportion, greatly facilitates the recognition of the single-flowered plants, because there remains to be eliminated from among the seedlings only from ten to fifteen per cent."

This separation of the single from the double-flowered plants, M. Chaté tells us, is not so difficult as might be supposed. The Single Stocks, he explains, have deep green leaves (glabrous in certain species), rounded at the top, the heart being in the form of a shuttlecock, and the plant stout and thickset in its general aspect; while the plants yielding double flowers have very long leaves of a light green colour, hairy, and curled at the edges, the heart consisting of whitish leaves, curved so that they completely inclose it.

Such is the substance of M. Chaté's method of securing so large a proportion of double-flowered plants, and then of separating them from the remaining single ones—a method which commends itself to the good sense of the intelligent cultivator.

Another plan for the separation of the single from the double-flowered plants, in vogue amongst a class of cultivators, is the degustation of the buds, that is to say, the chewing of the young buds: the single plants can be recognised by their crispness and greater consistence, and can thus be weeded out. The disadvantage attending this method is that the plants, single as well as double, must all be grown up to the period when these buds are tolerably well advanced.

**STOCK, TEN-WEEKS.** A common name for *Mathiola annua* (which see).

**STOCK, VIRGINIAN.** A common name for *Malcolmia maritima* (which see).

**STÉCHAS.** Included under *Lavandula*.

**STOKES' ASTER.** See *Stokesia cyanea*.



FIG. 542. *STOKESIA CYANEA*

**STOKESIA** (named in honour of Jonathan Stokes M.D., 1755-1831, the coadjutor of Withering in his

**Stokesia**—*continued*.

arrangement of British plants). *SYN. Cartesia.* *ORD. Compositæ.* A monotypic genus. The species is a handsome, sparingly-branched, greenhouse, erect, perennial herb. It thrives in the open border during the summer months. Propagation may be effected by seeds, or by division of the roots.

**S. cyanea** (blue).\* Stokes' Aster. *fl.* heads blue, lin. across, few or solitary, terminal, pedunculate; involucre sub-globose, the outer scales prolonged into a leafy, bristly-fringed appendage, the inner ones lanceolate and entire; florets narrowly five-cleft; pappus composed of four or five chaffy scales. August. *l.* alternate, smooth, lanceolate, entire or spinuloso-ciliate at base; lower ones petiole; upper ones amplexicaul. Stem 1 ft. to 1½ ft. high. North America, 1766. See Fig. 542. (B. M. 4966.)

**STOLE**, or **STOLON.** A branch arising from near the base of the parent stem, resting on the soil, rooting at the tip, and finally tending to form a new plant, capable of independent growth when the branch is cut, or dies away, between the terminal bud and the parent plant. Certain modifications of Stolons have received distinctive names, of which the more important are: Offset, a short Stolon (*e.g.*, *Semprevivum*), and Runner, a very slender Stolon, with long, naked internodes (*e.g.*, Strawberry).

**STOLONIFEROUS.** Bearing, or propagating by, stolons, runners, &c.

**STOMA** (plural, *Stomata*; from *stoma*, a mouth). The Stomata are little openings, or mouths, in the outer covering or epidermis of the green parts of plants, through which they may be said to breathe. The air passes into the plant from the outside, bringing with it Carbonic Acid gas. This gas is broken up in the cells containing chlorophyl: all the Carbon, and half of the Oxygen, of the Carbonic Acid are retained by the plant, to be built up into starch, and other foods; and half of the Oxygen escapes from the plant into the outer air, through the Stomata. The air passing out is loaded with vapour of water evaporated from the cells of the leaf; and thus there is a constant escape, through the Stomata, of water from green parts of plants. The form and structure of the Stomata do not vary much in vascular plants; though many groups of these plants exhibit peculiarities in the form and arrangement of the cells of the epidermis that lie round the Stomata, and that are often called the "neighbour-cells"; but it is not necessary here to enter upon a description of the latter. The Stoma, or opening, lies between two sausage-shaped cells, called "guard-cells," which are joined near the ends, but leave a space between them in the middle. This opening leads into an empty space between the cells, below the epidermis, from which space crevices pass in all directions, opening into larger ones among the loosely-arranged cells in the middle of the leaf. There is a constant passage of gases into and out of the cells through the thin cell-walls that border the inter-cellular spaces, with results upon the atmosphere as stated above, if green plants are exposed to daylight. The guard-cells are usually green, owing to the presence in them of chlorophyl. They thus present a contrast to the ordinary cells of the epidermis, which contain few, if any, chlorophyl-bodies in land plants, except in Ferns, and a few others. The guard-cells regulate evaporation from plants, since they swell when full of sap, and become more convex, thus leaving a wider opening between them when a plant contains much sap and would benefit by the evaporation of some of it. In dry weather, when there has been much evaporation, the guard-cells contain less sap, and thus become straighter, and leave a narrower slit; so that evaporation becomes much slower through the Stoma when it requires to be diminished in amount. Stomata seldom occur on parts of plants habitually under ground, or under water, where they would be useless. They are most abundant on leaves, especially on the lower surface, except in some Conifers, and a few other plants, in which

**Stoma**—*continued*.

they are more numerous on the upper surface. Where the sides of a leaf are equally exposed to light, *e.g.*, in vertical leaves, or phyllodes, the Stomata are disposed in equal numbers on both surfaces. In floating leaves (*Nymphaea*), they occur only on the upper surface, exposed to the atmosphere. The number varies in different plants from a few hundreds to over 300,000, on a square inch of surface of a leaf, but from 20,000 to 150,000 seem to occur most frequently on that space.

Besides the ordinary Stomata for the passage of air, and of water in the form of vapour, many plants possess others of much larger size, placed singly or in groups along the edges of the leaves, above the ends of the veins. They resemble the other Stomata in form, but their guard-cells cannot move, *i.e.*, cannot alter the width of the slit between them. Their use is to permit the escape of water in drops, instead of in vapour. A familiar example of this action may be observed in *Richardia africana*, from the tip of whose leaves drops of water often fall. It is also exhibited in the drops of water that are so frequently seen on the tips of the leaves of young Wheat, and of other Cereals, in damp evenings, when evaporation is slow. The water thus exuded often has Carbonate of Lime in solution, and, as the drops evaporate, this is deposited, in such plants, in a white crust around the waterpores, as such Stomata are called.

**STOMATIFEROUS.** Stomata-bearing.

**STONE.** A hard body produced by the ossification of the endocarp or lining of certain fruits, which are commonly known as Stone Fruits; *e.g.*, Apricot, Peach, Plum.

**STONECROP.** A common name for *Sedum* (which *see*).

**STONE ORPINE.** A common name for *Sedum reflexum* (which *see*).

**STONE PINE.** A common name for *Pinus Pinea* (which *see*).

**STONNORD.** An old name for Stonecrop. *See Sedum*.

**STOOL.** A stemless "mother" plant, from which layers are annually propagated, by bending into the soil.

**STORAX.** *See Styraz*.

**STORAX, LIQUID.** *See Liquidambar imberbe*.

**STORING.** A term applied to the lifting of certain vegetables, principally root crops, in autumn, and placing them in sand or dry soil, under cover, where a portion can be procured for use at any time during the winter. Beetroots, Carrots, Potatoes, Salsafy, Scorzonera, &c., are well-known examples. The term is also applicable to the preservation of fruits and, indeed, almost anything which has to be housed and kept after maturity for future use.

**STORK'S BILL.** A common name for *Pelargonium* (which *see*).

**STOVE.** A plant-house devoted to the cultivation of subjects requiring a high temperature, many of which are amongst the most beautiful, either for their flowers or for their fine foliage. Where large specimens are grown, it becomes necessary to provide accommodation on an extensive scale; but, in the majority of gardens, a single Stove, or a house with a division in the centre, suffices. In a large collection, even of Stove plants, many will need a higher temperature than others: one division of a house may generally be kept hotter than the other, and so the proper requirements are met. When only one house is available, much may be done by keeping such plants as require most heat at the warmest end, and by admitting whatever air is required at the cooler end.

The best form of structure suited for a Stove is that

**Stove**—*continued*.

known as the span-roofed; the hip-roofed also answers well, but the wall on one side excludes a portion of the light that would be secured in the span. For the successful culture of Stove plants, particularly flowering kinds, the admission of all possible light is one of the most important conditions. When subjected to plenty of light, foliage plants also assume a more beautiful colouring, and have a shorter-jointed growth, than when situated unfavourably regarding this provision for their well-being. A plunging-bed should be provided, and heated either by hot-water pipes with cocoanut fibre above, or by tan; the latter is not always procurable, and is sometimes objected to. In large span-roofed Stoves, of from 15ft. to 18ft. in width, it is generally best to have the plunging-bed in the centre, a path down either side, and a stage next the side all round. This stage should not be of open woodwork if there are hot-water pipes beneath, but made of slate, or constructed of wood, so that some ashes or shells may be placed beneath the pots for retaining moisture.

Ventilation should be arranged so that air cannot, on entering, come in direct contact with the plants; for preventing this, it is best to place side ventilators in the walls near the pipes, and to only use others situated near the top when there is comparatively little difference between internal and external temperatures. Most Stove plants require a light shading from the summer's sun; this is best fixed on rollers, so that it may be let down and drawn up at any time, according to the weather. Generally, plenty of water and a moist atmosphere are necessary in the Stove; the plants must, therefore, be well and carefully drained, and the soil used be of an open description, whether loam or peat, in order that water may readily pass through.

In the arrangement of Stove plants, overcrowding should be avoided, as growth is rapid with many of them, and the plants soon become drawn or one-sided. Cleanliness amongst plants, and also pots, is of great importance: a high Stove temperature favours the multiplication of insects, particularly if a moist atmosphere is not always maintained.

**STRAMINEOUS.** Straw-coloured.

**STRAMONIUM.** Included under *Datura* (which *see*).

**STRANGEA.** Included under *Grevillea* (which *see*).

**STRANVÆSIA** (named after the Hon. W. Fox Strangways, F.R.S., a learned investigator of the Flora of Europe). *ORD. Rosaceæ.* A monotypic genus. The species is an ornamental, nearly hardy, evergreen, branched tree. It succeeds best when planted against a south wall, and slightly protected during severe weather. Propagation may be effected either by grafting, or by budding upon the common Thorn.

**S. glaucescens** (grey-leaved). *f.* white, at length floccose; calyx persistent, the tube campanulate, the limb of five erect lobes; petals five, sessile, spreading, pilose at base; corymbs axillary and terminal, many-flowered. June. *f.* orange-coloured, small. *l.* alternate, petiolate, simple, coriaceous, ovate-lanceolate, serrulated; stipules bristly. *h.* 20ft. Temperate Himalaya and Khasia Mountains. (B. R. 1956.)

**STRATA** (plural of *Stratum*, meaning anything spread out, or strewn over a given surface). A term used to denote the layers in sand or in rocks, such as may be seen in a sand-pit, a slate-quarry, or a chalk-pit. One sees the layers in cuttings as thinner or thicker bands, one above the other; and that they are spread out one above the other can be recognised if each layer is carefully removed from the surface of the one below it. By far the greater number of different kinds of rocks show layers, but some, such as granite and trap, do not. The layers, or Strata, are now believed by all geologists to

**Strata**—*continued*.

be the result of the sand, or other substances of which rocks are made, having been at first strewed over the surface, on the bottom of seas, lakes, or rivers, less often by wind on the dry land. Gradually, the layers were pressed down by new layers above them, and, at last, often became converted into stone. The age of the Strata can often be determined from fossils of animals and plants that have been covered up in the soft mud, and turned into stone in it. The rocks that do not show Strata have been exposed to great heat, sufficient to melt them, so that any marks of Strata in them have disappeared where they once existed, *e.g.*, in crystalline limestone.

**STRATIOTES** (from *stratiotes*, a soldier; in reference to the sword-shaped leaves). Water Soldier. ORD. *Hydrocharidææ*. A monotypic genus. The species, *S. aloides* (Crab's-claw, Freshwater Soldier, &c.), is a stoloniferous, submerged, aquatic herb, inhabiting Europe

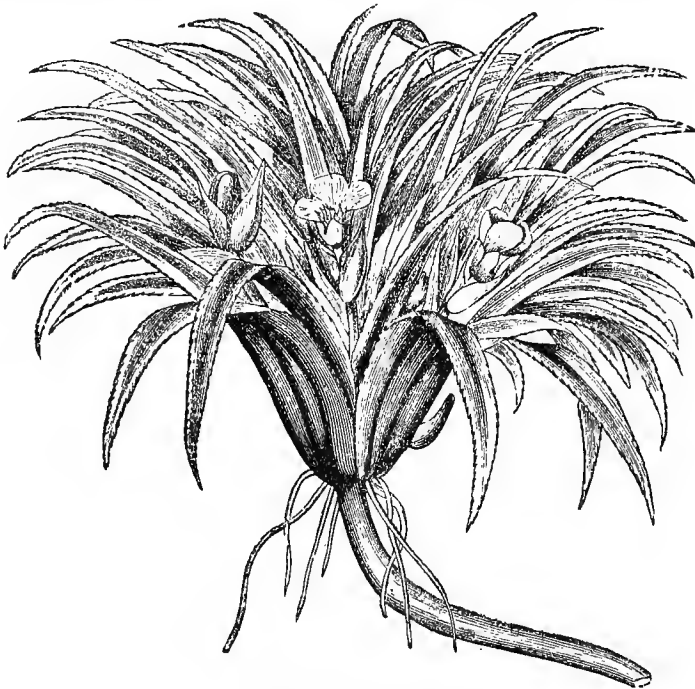


FIG. 543. STRATIOTES ALOIDES.

(Britain), &c., and resembling a miniature Aloe (see Fig. 543). Owing to the great rapidity with which it increases, its introduction into ornamental waters is not recommended.

**STRATUM**. A layer of tissue. See also **Strata**.

**STRAVADIUM** (from *tsjeria samstravadi*, the Malabar name of one of the species). ORD. *Myrtacææ*. A small genus (about five species) of ornamental trees, now included, by Bentham and Hooker, under *Barringtonia*. Calyx three or four-cleft, with imbricated lobes. The two best-known species are described below. They require a compost of two parts loam, one peat, and one sand. Water should be given in abundance, and a moist atmosphere at all times maintained, the temperature ranging from 65deg. to 95deg. Propagated by cuttings, with leaves intact, obtained from the lateral shoots; these, taken off at a joint when the wood is ripe, and inserted in sand, with a hand glass over them, root readily.

**Stravadium**—*continued*.

- S. album** (white). *fl.* white, in very long, pendulous racemes June. *fr.* ovate. *l.* cuneate-oblong, acuminate, obsolete serrated. *h.* 20ft. Polynesia, &c., 1850.
- S. rubrum** (red). *fl.* red, in very long, pendulous racemes. June. *fr.* acutely four-angled. *l.* cuneate-oblong, acuminate, obsolete serrated. *h.* 20ft. to 30ft. East Indies, 1822. SYN. *Barringtonia acutangula*.

**STRAW**. A term applied to the above-ground stems of Grasses.

**STRAW**. This is of great value in gardens, as coverings for protecting plants and vegetable crops against frost; also for placing beneath Strawberry-plants in summer, to keep the fruits from being splashed and soiled by rain. Straw used for covering up potatoes, &c., during winter should be clean and dry; it should also be of a similar description, if procurable, for most purposes of protection. When obtained from stables, in the form of litter, the best may be shaken out, if necessary, and used for surrounding and covering up frames during severe weather; the value of the remainder, for mixing with leaves to form hotbeds and manure, is well known.

**STRAWBERRY** (*Fragaria*).

Several species of *Fragaria* have contributed towards the production of the numerous kinds of cultivated Strawberries. There are few gardens in which some plants are not grown, the fruit being one favoured by everybody, and always held in high esteem. Forced Strawberries are generally the first new fruits of the year, and the operation of preparing and forcing plants is always one of the most important garden operations. It is well known that the fruits are used, when ripe, in various ways, principally for dessert, but also for cooking and preserving.

**Propagation**. This is effected by seeds, occasionally by division, but most generally by runners. The varieties are preserved true by the latter method; and, with some few exceptions, runners are produced in abundance during summer. The Alpine Strawberries, however, are best raised annually from seed, or, at least, the plants should not be kept more than two years. Seeds of these, and also of any others, if it is desired to raise plants by that method, should be saved from large,

well-ripened fruits in summer. The fruits may be crushed, and dried on thick paper, or the pulp may be separated from the seeds by means of water, the seeds being afterwards dried. Only those which are firm and sink in the water should be kept; others that float on the surface are useless. Sow at once, or dry the seed and preserve it until the following spring. At the latter part of summer, a seed-bed, in a sheltered place outside, will answer well, if watering is carefully attended to. Pots and boxes are also suitable. Where a little warmth is at command, such as a gentle hotbed, the seedlings may be brought on rapidly to a size large enough for planting out where they are intended to fruit. Seedling Strawberries, sown early in the season, bear a little late fruit the same year, but a much better crop the year following. If any runners appear which are not required, they should be cut off at an early stage. Increasing by means of division is sometimes practised when runners cannot be secured, but it is not to be recommended, as divided

**Strawberry**—*continued.*

plants are never certain to succeed. It may best be done, if requisite, in early autumn, or just before growth commences in spring.

Runners afford the best and most general method of propagation. They readily root into the ground, unless it is very hard, and may be lifted with balls and replanted; but a better way is that of layering in small pots of loamy soil, and allowing them to root into it. Runners are entirely supported by the parent until they form roots of their own; this they do readily, when coming in contact with soil that is of a proper description regarding moisture, &c. If pots cannot be spared, runners for planting-out may be procured, well rooted, and in good condition for lifting, by loosening the earth and placing some light, leafy soil beneath them, just when the roots begin forming. The method of layering on pots will be further mentioned in relation to the methods of preparing plants for forcing.

*Soil, Planting, &c.* Strawberries grow very well in almost any good garden ground, but succeed best in rather strong loam, of a good depth, and in a somewhat moist situation. In a dry summer, the crop frequently proves a failure on plants subjected to a light soil or gravelly sub-soil, as, if flagging is once allowed, the fruits seldom ripen properly. Previous to planting, the ground should be well trenched, and plenty of good manure intermixed. Very stiff soils are not suitable, as they are so liable to cake into hard lumps, which crack open during dry weather. Stiff soils may be much improved by adding rotten leaves, peat, or leaf mould, during the trenching process.

Planting is best performed about the middle of August, or so soon as well-rooted runners can be secured. Some persons layer Strawberries very successfully for planting purposes on small pieces of turf of square or triangular shape, lin. or more thick: the roots do not then become twisted and interlaced, as they do in pots, and a piece of turf is admirably adapted for them to enter and permeate. The turf may be sunk a little into the ground, and kept watered; in transplanting, they should be carefully lifted with a trowel. It is not always convenient to prepare land for Strawberries at the season above named; but it is of great importance that the young plants should be put into their permanent quarters early, and receive every encouragement to get them established before winter. That showery weather should be selected, if possible, need scarcely be remarked. Land which has been occupied by early Potatoes or Cauliflowers is not unfrequently in good order for planting with Strawberries without any preparation beyond levelling down, providing the soil is sufficiently heavy, and the situation can be spared. Strawberry-plants that have been forced are available for forming an outside plantation when the fruit has been gathered; but the balls should be thoroughly soaked in water, and the leaves dipped in a soft-soap solution if they are infested with Red Spider—which is sometimes hurtful to such plants—before being put into the ground. When planting Strawberries, the soil, which should be moderately moist, must be rendered quite firm about their roots. Should the weather be dry, watering must be attended to until the plants are thoroughly established; they will need but little further attention for the season. The distance at which to plant varies a little, according to the strength of soil and the varieties. Generally, the rows should be from 2ft. to 2½ft. apart, and the plants about 1½ft. asunder in the rows; but small-fruited varieties (Black Prince and the Alpines, for instance) may be planted much closer together. The soil should never be dug between Strawberry-plants, as there are so many roots near the surface, which would be destroyed. Large weeds may be pulled occasionally by the hand and carried away, to prevent seeds dropping.

**Strawberry**—*continued.*

Strawberry plantations should be partially renewed every year, as young plants produce larger, and in every way superior, fruit to old ones. Three, or at the most four, years is a limit; when plants have been in one situation for this period, it is best to destroy them, provided others are coming on for a succession. The general treatment of Strawberries outside may be briefly summed up: To keep the fruit clean, the spaces between all fruiting plants should be mulched with short straw or light, clean litter, in May or June, just before the flowers open. For providing nourishment to the roots, a mulching of short, rotten manure may be spread over the surface first, and then the straw above. If runners are not required, they should be cut off at intervals, soon after being formed, unless the parents are disposed to grow too strongly to leaf, when some of the earliest may be left. At the latter part of summer, and early in autumn, considerable growth is made, and another mulching of good manure is generally of great advantage. A full crop must not be expected the following year from young plants; but, if they are put in early, a few nice fruits are generally produced, and also excellent runners for layering to force. Strawberries two and three years old bear the heaviest crops of good fruits. Watering is sometimes a necessity when the fruits are swelling, if droughts prevail or the soil is too light. A good soaking should be administered; a little on the surface is useless. A mulching of manure beneath the straw, as referred to above, helps to keep the ground cool in summer, and prevents, to a great extent, undue evaporation.

*Forcing.* Before successful forcing of Strawberries can be carried out, it is necessary that strong and well-ripened plants be prepared; this latter subject may, therefore, be referred to at the commencement. So soon as any runners appear, and forcing is intended, layering should be at once commenced. Perhaps the plan most generally adopted is that of layering first on small pots, and then transferring to the sizes in which the plants are intended to bear afterwards. This system is widely practised, more generally, perhaps, than any other; but that here recommended is to layer, whenever practicable, on the fruiting pots in the first instance. This entails more labour at the outset, but the necessity for a second potting is avoided. Both methods may be referred to, as some cultivators favour one and some the other.

For layering on small pots, the size known as 60s are best adapted. They should be washed clean, and then allowed to get dry; no crocks need be used, a little rough fibre from the loam placed in the bottom will afford ample drainage, the remainder being filled with loamy soil, pressed moderately firm. Strawberries for forcing should always be raised from the strongest runners procurable; these are invariably borne earliest in the season, and by plants one or two years old. A single plant is quite sufficient for one pot; it should be placed in the centre, just as roots are forming, and made secure by a peg, the runner being then pinched off just beyond the plant that is layered. Pegs made from stems of common Brake Fern answer well, as they are not required to last long. The runners take root quickly if the soil is kept moist, and soon become sufficiently established for detaching from the parent, and taking away previous to potting on for fruiting. It is important to leave them until well rooted; the check consequent on throwing the plant on its own resources in this respect, is then but little felt; whereas, if there are only a few short roots formed, the leaves often flag, and the plants are slow in recovering strength.

The customary method of proceeding with Strawberries layered on small pots is as follows: When strong roots have fairly permeated the soil, the plants are cut off, taken away, and either stood in some open situation for a few days previous to potting, or potted on at once.



**Strawberry**—*continued.*

The pots most generally used are of the size known as 32s, which measure about 6in. in diameter. These should be clean, dry, and well drained; a little rough turf is also recommended for placing over the drainage, and, if a sprinkling of dry soot is shaken amongst this, it will materially aid in keeping out large worms, which often enter at the bottom if they have an opportunity.

The best soil for Strawberries in pots is turfy loam, somewhat heavy rather than light, used to the extent of about two-thirds of a compost, the remainder being good, short manure, such as leaf mould, or horse-droppings which have laid for a time, or well-rotted cow-dung. Some cultivators use bone-meal or crushed bones, in preference to other manures, with excellent results. The compost should be suitably moist for ramming firmly with a hand-rammer; and it is important that none of the plants are dry at the time of potting. Stand them in a shady place for a few days, unless the weather happens to be dull, and afterwards place them in an open situation with full exposure to the sun, on a firm bottom, such as gravel or coal ashes, which allows water to pass away, and also keeps worms from entering the pots. As the plants grow, they must be stood wider apart, always allowing sufficient space between them, so that the leaves of one do not overgrow another. The crowns should be kept pointed towards the south, with a view to getting them strong and well ripened by exposure to the sun's influence. Strawberries in pots require constant attention in watering through the summer and early autumn; they need copious supplies whenever it is fine, but, in showery weather, the rain often supplies sufficient moisture for several days together, and growth made under such naturally favoured conditions is then rapid. Before there are any severe frosts, the plants should be stored away for the winter, or until they are required for forcing. They may be plunged amongst dry leaves, in cold pits or frames, where litter or some other covering can be thrown over to exclude frost. On all fine days, and during mild weather, the sashes should be removed: the plants only need protection from heavy rains and sharp frosts. Where frames or pits cannot be spared, the plan of plunging the pots in ashes, one above another, against a south wall is sometimes adopted, the pots being laid on their sides, with the crowns outwards, and all one way. Garden mats may then be laid over them at any time, if it becomes necessary.

Under the system of layering on the fruiting-pot, the mode of treatment is very similar, except that no small pots are need, and, consequently, no second potting is necessary. The large pots (6in.) should be cleaned, well-drained, and filled with good soil, at the first; then taken to the Strawberry plantation, and the selected runners placed on them, in the way previously described. Watering must on no account be neglected, not giving sufficient to cause sourness in the soil, which, it is important to remember, has to serve the roots for the season. When the plants get established, they may be detached from the parents, and afterwards treated in precisely the same way as has been already described. No check consequent on repotting is experienced by plants thus treated; and the pots may, in the first place, be filled rapidly with soil. They are not so readily taken to and from the plantation as when the small size is used; but, on the other hand, when established, they may be taken direct to the place where they are to remain for the summer, and there is no fear of injury from the roots becoming starved, because of delays that often unavoidably occur in getting the work of re-potting completed.

The preparation of plants for forcing has been thus fully detailed, because on it principally depends the success with them when introduced under glass for

**Strawberry**—*continued.*

fruit-bearing; or, at least, superior forced fruit must not be expected if the crowns are not strong, plump, and well-ripened, at the outset. Strawberry forcing, and its attendant results, are matters of very great importance to most gardeners every season. Under successful management, good fruits may be secured some time during the month of April; earlier than this, the amount of natural heat and light necessary, through all stages, for attaining proper development, is seldom forthcoming. Some of the best-ripened plants of an early variety—such as Keen's Seedling or Vicomtesse H. de Thury—may be introduced under glass, for starting during December, or early in January. The temperature at first must not exceed 40deg. to 45deg. at night, and from 45deg. to 50deg. by day, with air on all favourable occasions. This will be sufficient to excite the crowns to push the embryo flower-stalks and leaves which they contain; but forcing must still be conducted very slowly, even until the time the fruits are set. By the time the plants reach the flowering stage, the days will have lengthened, and full sunlight must be admitted to them, with a free circulation of air—always avoiding a draught. When flowering, an average temperature of about 55deg. must not be exceeded, and the admission of air from some quarter is essential for insuring fertilisation; the atmosphere at this period should be kept somewhat drier than is advisable at any other time, till the fruits are ripe, and syringing must, for a few days, be discontinued. The strongest flowers appear amongst the first that open; and if from nine to a dozen of these can be induced to set properly, it will be a good crop, and all the smaller, secondary flowers may be clipped off so soon as these are safe. During forcing operations, it is important to remember that the four parts of a Strawberry flower are formed in succession, and that the most essential of all, the pistil, arrives last at maturity to perform its allotted function. It must not, therefore, be inferred that, when the calyx appears, and the white petals expand, the other organs are similarly advanced. In early forcing particularly, great care must be taken in regard to temperature and moisture during the whole flowering period. After the crop is set, a higher temperature should be gradually applied, about an average of from 60deg. to 65deg.; or the plants that are sufficiently advanced may be shifted into another house, if there are others coming on for a succession.

Watering must receive special attention. Plentiful supplies are requisite, especially when the fruits are swelling, and no Strawberry-plant should ever be allowed to get quite dry at the root. The application of manure-water is of great advantage while the fruits are swelling, or the plants may be assisted more conveniently, and quite as efficiently, by placing a little artificial manure over the surface of the soil once a week, and watering it in. The effect is most marked just as the first signs of colouring are seen, and this should be the last application made. Syringing may be freely practised until the fruits begin colouring; besides supplying moisture, it materially aids in keeping down Red Spider. When the earliest fruits are nearly ripe, carefully transfer the plants to a cool, airy house for two or three days before gathering; this will often improve the flavour immensely. As the crop is taken, the plants may be turned out and thrown away, or preserved for forming a new plantation, according as they may or may not be required: others will be coming on to take their places. Where large quantities of Strawberries are forced, a Strawberry-house, specially devoted to bringing on successions, is the best arrangement. This should be fitted up with beds or shelves, near the glass, where full exposure to sun and light is at all times secured. The quantity of plants forming a successional batch must

**Strawberry**—*continued.*

be determined by the total intended to be forced, the space available, and other conditions that are mostly of individual, and not general, application. Forced plants of Vicomtesse H. de Thury Strawberry are sometimes induced to bear a second crop in the following autumn. They are reduced a little at the root, then potted up afresh, and grown on either outside or in frames. Towards autumn, a second crop of flowers appears; and if they set well, the fruits can be ripened with fire-heat, and a fairly good crop assured, that proves invaluable for dessert, even if of second-rate quality, so far out of the natural season. The variety above named is peculiarly noted for this method of treatment; none of the others that are forced are adapted for autumn fruiting with the same degree of certainty.

**Insects, &c.** Few species have been recorded as noticeably injurious to the Strawberry; but this plant, like almost all other garden herbs, is liable to have the leaves and flower-buds eaten by **Surface Caterpillars**, and the roots devoured by larvæ of **Cockchafers**, and species of **Otiorynchus**, especially of *O. sulcatus*. Information in regard to the insects, and the best means of lessening the damage done by them, will be found under the headings indicated.

In Ormerod's "Report of Injurious Insects," for 1883, is an account of serious damage done near Chester, in May and June, by the larvæ of a small Moth called in the Report the "Strawberry-leaf Button Moth," *Peronea comparana* (?). The flowers and sides of the leaflets were spun together and eaten by the larvæ, and the result was that badly-infested plants died. "Young Strawberry-plants of twelve months old are never affected; two-year-old plants are affected rather badly, but three-year-old plants are invariably ruined." The larva is cylindrical and green, with a pale yellow head, and is rather bristly. The pupa is pale green, with reddish wing-cases and abdomen. The moth, which appears at the end of June, is under  $\frac{1}{2}$  in. in spread of fore wings, which are pale ochreous, with a large, dark brown, triangular blotch running in from the front margin of each wing two-thirds across it; there is a dark streak inwards from the hind margin near the base of the wing. The hind wings are grey. There is probably a second brood of the insects in autumn. In the "Entomologist" for 1881 (p. 232), an attack, similar to the above, is recorded from near Blairgowrie, in Perthshire, but the moth is named *Peronea aspersana*. Yet it is the same species, perhaps, though apparently there is uncertainty about the correct name. Probably, the remedy suggested in the "Report" quoted above, of skimming the soil, to remove pupæ with it, and with the surface rubbish, would be found useful.

The leaves of Strawberry-plants that have been forced are liable to serious harm from the Red Spider (see **Tetranychus telarius**). During the process of forcing, Strawberries are also invariably attacked by Green Fly, which prove very destructive if not checked at first. Fumigating with tobacco-smoke is the best and most effectual remedy, but this should not be done while the plants are in flower. At any stage before flowering, or after the fruits are set, no danger need be apprehended, provided, of course, that the method of fumigating is properly carried out.

The fruit of the Strawberry is liable to be eaten by **Slugs** and **Snails** (which see), as well as by **Millipedes**, such as *Polydesmus* and *Julus* (see **Millipedes**). Mice, too, often prove very destructive, by nibbling off the fruits before they are ripe, or by eating the seeds, when they are at all prominent, from ripe fruits.

**Fungi.** The Fungi parasitic on Strawberries are few in number, and so far as experience goes, not seriously hurtful to the plants. The most conspicuous in their effects produce spots on the leaves, sometimes in very

**Strawberry**—*continued.*

great profusion. The spots are at first brownish-red, surrounded by a brighter red margin. After a time, the centre becomes white, by separation of the epiderm from the lower tissues, and because of the presence of air below it. In the white area lie imbedded various minute, black specks, which the microscope shows to be pycnidia inclosing sporidia, or perithecia, with spores in asci. The only Fungus of this group recorded from Britain as living on the Strawberry is *Leptothyrium Fragariae*, which has minute, cylindrical sporidia (each with four or five dots in it) in its pycnidia. On the Continent there have also been recorded: *Ascochyta Fragariae*, with two-celled sporidia; *Phoma fragaricola*, with one-celled, small sporidia; *Septoria Fragariae*, with three-septate sporidia; and *Sphaerella Fragariae*, with two-celled spores in asci. The spots produced by all these are much alike; and it is doubtful in how far the various Fungi belong to species really distinct among themselves. When very abundant, they injure the leaves, and thus weaken the plants. It has been observed that plants on clay soils are more liable to attack, and that, if transferred to more open soil, they become almost free from the Fungi. No direct remedy is known, but the plants, though weakened, are seldom killed by the disease.

The fruits, when beginning to decay, in damp places, are often overgrown with moulds. The best preventive is the freer admission of air.

**Sorts.** Of the hybrid or large-fruited Strawberry so largely cultivated in gardens, a selection of sorts is subjoined, which includes those generally grown for forcing, and for early, mid-season, and late crops outside. Where the object is to give only a selection, and there are so many to choose from, it is not unlikely that some of those omitted are of equal merit with others included. Alpine Strawberries (*F. vesca monophylla*) are represented in Red and White varieties. The Bush Alpine is a distinct Strawberry, inasmuch as the plants produce no runners. There are red and white forms of this, which may be raised from seeds or increased by means of division. The fruits of the Hantbois Strawberry (*F. elatior*) possess a peculiar and strong flavour, which is disagreeable to some people, but much liked by others. A few plants are generally grown in gardens, but rarely a quantity. Runners are freely produced, and afford a ready means of raising or increasing a stock.

**Bioton Pine.** Fruit creamy-white, sometimes tinged with red where exposed to the sun, large; flesh white, juicy, of fairly good flavour. Mid-season. Plant very productive, of compact habit.

**Black Prince.** Fruit dark red, shining, changing almost to black when quite ripe, small; seeds prominent. The plant is a free bearer, and forces well. It is valued, both for forcing and outdoor culture, on account of its earliness.

**British Queen.\*** Fruit light scarlet, but not always uniform in colour, frequently very large, often flattened; flesh white, very juicy and richly flavoured. When well grown, this may justly be designated the best of all Strawberries; but the plant is tender, and does not always succeed and bear satisfactorily. It is much esteemed as a late variety for forcing.

**Dr. Hogg.\*** Fruit light red, cockscomb-shaped, very large; flesh pale pinkish-white, solid, very rich. The plant has much the appearance of BRITISH QUEEN, but is much hardier, rather later, and more prolific than that variety.

**Elton.** Fruit dark red or crimson, large; flesh red throughout, firm, briskly acid; plant very hardy, vigorous, and prolific. A valuable late variety, specially adapted for preserving; it is an almost certain bearer, and ripens in long succession.

**Frogmore Late Pine.** Fruit dark red, very large. This ripens about the same time as ELTON, and is of better flavour than that variety. Plant of free-bearing habit.

**James Veitch.** Fruit bright vermilion, very large and handsome; flesh solid, rich and juicy. Plant very robust. A mid-season variety; it sometimes produces fruit of unusual size.

**Keen's Seedling.\*** Fruit dark crimson next the sun, large, roundish; flesh scarlet, rich and agreeably flavoured. This is an

**Strawberry**—*continued*.

old and well-known variety of great excellence; it is one of the best for forcing, and is invariably included amongst varieties for that purpose. It is also grown extensively outside, where it succeeds admirably.

**La Constante.** Fruit bright crimson, large, conical; flesh white, tinged red, juicy, briskly flavoured. Plant dwarf; a great bearer; rather late.

**La Grosse Sucrée.** Fruit dark red, medium or large; flesh pale red; flavour slightly acid. A free-bearing variety, well adapted for forcing.

**Loxford Hall Seedling.\*** Fruit bright crimson where exposed, large, handsome, conical or sometimes cockscomb-shaped; flesh red, solid, of excellent flavour. An invaluable variety, the latest of all, of great excellence.

**Lucas.** Fruit deep scarlet or crimson, large, conical or sometimes cockscomb-shaped, handsome; flesh solid, highly flavoured. Mid-season or rather early. Plant free-growing and a good bearer.

**Marguerite.** Fruit bright red, very large, often of an unusual size; flesh juicy and tender. A productive early variety, sometimes used for forcing.

**Pauline.** Fruit deep red, large, with smooth neck; flesh firm, richly flavoured. A large and very early variety, and a good bearer.

**Pioneer.** Fruit very dark red, medium-sized; flesh solid, bright red, of rich, brisk flavour. Plant vigorous, a great cropper, one of the earliest.

**President.\*** Fruit bright red, often very large and handsome; flesh light red, solid, highly flavoured. An excellent, free-bearing Strawberry, largely grown for forcing, and still more extensively for general crop outside.

**Sir Charles Napier.\*** Fruit clear light scarlet, large and handsome; flesh pale, firm, briskly flavoured; seeds small, and very prominent. A most abundant bearer, and a variety very extensively grown for market; it is also well adapted for forcing. The plant is unusually tender.

**Sir Harry.** Fruit dark red or crimson, very large; flesh dark red, very juicy, of excellent flavour. An abundant bearer, grown extensively for market; it ripens at the same season as KEEN'S SEEDLING, which it somewhat resembles.

**Sir Joseph Paxton.\*** Fruit bright crimson, large, even in outline; flesh solid, and richly flavoured. Mid-season or rather early. The plant is hardy, a free bearer, and forces well. This is one of the best and most useful Strawberries grown.

**Vicomtesse Héricart de Thury.\*** Fruit bright red, medium-sized, conical; flesh pale red, solid, brisk and richly flavoured. The plant is compact, and almost evergreen; it is one of the most abundant bearers, and succeeds well forced.

**STRAWBERRY-BUSH.** A common name for *Euonymus americanus* (which see).

**STRAWBERRY-TREE.** A common name for *Arbutus Unedo* (which see).

**STREBLANTHERA.** A synonym of *Trichodesma* (which see).

**STREBLORHIZA** (from *streblos*, twisted, and *rhiza*, a root; in allusion to the shape of the root). ORD. *Leguminosæ*. A monotypic genus. The species is an elegant, glabrous, half-bardy, climbing shrub, allied to *Clianthus*. Loamy soil, with the admixture of a little charcoal and leaf mould, is most suitable for the culture of this plant. The compost should not be sifted, but broken up by hand, and pressed firmly in the pots. After potting, the plants should be placed in a pit with other hard-wooded subjects, and kept close for a few weeks, being syringed daily. If it is desirable to keep the plants in pots, they can be either trained out on sticks or a trellis, or on pillars or walls, for which purpose they are well adapted. Thorough drainage must be insured when planting out, and the compost may be the same as for potting, a

**Streblorhiza**—*continued*.

depth of about 18in. being sufficient. Abundance of water must be given at the roots, and the syringe freely used. When grown in pots, the plants will require shifting annually during March or April, previous to which all the laterals should be pruned hard back, and the leading shoots also shortened. Propagation may be effected by seeds, or by cuttings.

**S. speciosa** (showy). *fl.* flesh-coloured, rather large, in axillary racemes; two upper calyx teeth very short; standard ovate, erecto-patent, sub-sessile; wings short. May. *l.* impari-pinnate; leaflets few, rather large, entire, exstipellate; stipules small. *h.* 3ft. Norfolk Island, 1840. (B. R. 1841, 51, under name of *Clianthus carneus*.)

**STREBLUS** (from *streblos*, twisted; in allusion to the twisted branches). SYN. *Epicarpon*. ORD. *Urticaceæ*. A monotypic genus. The species is a stove, unarmed, glabrous shrub or tree. It thrives in a compost of rich loam and fibry peat or leaf mould. Propagation may be effected by seeds; or by cuttings, inserted in sand, under a bell glass, in heat.

**S. asper** (rough). Paper-tree. *fl.* dioecious, the males in clustered heads, the females solitary on the peduncles. *l.* alternate, shortly petiolate, slightly toothed, rather rigid, scabrous, pinniveined; stipules lateral, small, deciduous. *h.* sometimes more than 20ft. Tropical Asia.



FIG. 544. STRELITZIA REGINÆ.

**STRELITZIA** (named in honour of the wife of George III., Charlotte of Mecklenburgh-Strelitz). Bird of Paradise Flower; Bird's-tongue Flower. ORD. *Scitamineæ*. A small genus (four or five species) of warm greenhouse, perennial herbs, restricted to South Africa. Flowers large and showy, few in a spathe, shortly pedi-

**Strelitzia**—*continued*.

cellate, with a long-exserted perianth; sepals three, ovate-lanceolate, long, free; petals unequal, the two lower or front ones united, each one lobed on the outer side towards the upper part, so that the two petals are distinctly halberd-shaped, and conceal within a fold the five perfect stamens, the third or posterior petal much smaller than the other two and somewhat hooded; bracts large and spath-like, boat-shaped, acuminate; scape terminal or in an upper axil, shortly exserted from the leaf sheaths. Leaves in long, sessile or stalked sheaths, ample, flabellately bifarious. Rhizome sometimes hypogæus, sometimes produced into an erect, woody stem. *Strelitzias* succeed in a mixture of two parts loam, and one part peat, with a little sand added. They require a liberal supply of water during summer; but very little need be given during winter. The principal methods of propagation are by suckers, and by division of old plants.

**Strelitzia**—*continued*.

posterior one nearly round, long and abruptly acuminate; spathes four, alternate, livid-green and purplish, at length 1½ ft. long; scape shorter than the petioles. May. *l.* oblong, obtuse at base. *h.* 2½ ft. A superb plant, considered, by the authors of the "Genera Plantarum," to be specifically identical with *S. augusta*. (R. G. 235.)

**S. parvifolia juncea** (small-leaved, Rush-like). *fl.* purple and yellow; scape equalling the petioles. May. *l.* blades absent or nearly so (in the type they are linear-lanceolate with flat margins); petioles resembling the stems of large Rushes. *h.* 4 ft. (B. R. 516.) The variety *angustifolia* has lanceolate leaf blades, one-seventh the length of the petioles.

**S. Reginæ** (queen's).\* *fl.* orange and purple, large, abundantly produced; scape free, equalling the leaves. April. *l.* very fine, ovate or ovate-oblong, green, mostly equal at base, broadly undulate-cripsed on the margins. *h.* 5 ft. 1773. This is the most magnificent species of the genus. The seeds are eaten by the Kaffirs. See Fig. 544. (A. B. R. 442; B. M. 119-20; R. G. 1877, 216.) *S. humilis* has been called a "reduced copy" of *S. Reginæ*.

**S. R. Lemoinierii** (Lemoinier's). A variety with golden-yellow sepals. 1880. (F. d. S. 2370-1.)



FIG. 545. STRELITZIA REGINÆ PROLIFERA, showing Habit and detached Inflorescence.

Seeds, which are also sometimes procurable, should be sown in light soil, and the pots plunged in moist bottom heat.

**S. augusta** (majestic).\* *fl.* whitish; calyx and corolla both pure white; the sagittate petals very short and rounded, the posterior one very small, acuminate. March. *l.* dark green, distichous, 2 ft. or more long, lin. to 1½ in. broad, oblong, sub-cordate at base; petioles 3 ft. to 6 ft. long, slightly glaucous, longer than the scape. *h.* 10 ft. 1791. A noble plant. (B. M. 4167-8; F. d. S. 173-4.)

**S. farinosa** (mealy). *fl.* purple and yellow; scape free, longer than the petioles. February. *l.* oblong, unequal at base; petioles half as long again as the leaves. *h.* 4 ft. 1795.

**S. humilis** (humble). A form of *S. Reginæ*.

**S. Nicolai** (Prince Nicolajevitch's). *fl.*, calyx whitish; petals blue, the sagittate ones rather large, triangular-ovate, the

**S. R. prolifera** (proliferous). This only differs from the type in the longer petiole and shorter blade of the leaf, and in there being two spathes developed on the same scape. See Fig. 545.

**S. R. pumila** (dwarf). A dwarf, compact variety. 1879.

**STREPTANTHERA** (from *streptos*, twisted, and *anthera*, an anther; alluding to the shape of the anthers).

ORD. *Irideæ*. A small genus (only a couple of species) of dwarf, bulbous, greenhouse plants, natives of South Africa. Flower solitary in the spathes, sessile; perianth with a very short, campanulate tube, and a rotate-spreading limb; stamens affixed to the throat; spathes one, two, or three, sessile at the sides of the peduncles; peduncles two or three in the upper axils. Leaves ensiform-lanceolate, erect or falcately spreading. The

**Streptanthera**—continued.

species are very pretty when in flower. A sandy loam suits them best. Increased by offsets.

**S. cuprea** (coppery). *fl.*, perianth tube purple; segments of a yellowish-copper colour, purple at base and with a pale yellow spot on each side; spathe two-valved, jagged a little at the point; scape smooth, somewhat flexuous, two to four-flowered. June. *l.* distichous, acute, mucronate; lower ones smallest. Stem about 9in. high, producing two or three scapes. 1825. (P. M. B. i. 8; S. B. F. G. ser. ii. 122.)

**S. elegans** (elegant).\* *fl.*, perianth pure white, slightly tinged with blush, with a bright purple centre, above which is a broken, black, velvety circle, marked with large, bright yellow spots; tube purple, shorter than the spathe, which is streaked with irregular, broken lines; scapes two or three, one or two-flowered. Spring. *l.* distichous, bluntish, with a very short mucro, narrowing as if cut a little above the middle. Stem about 9in. high. 1827. (L. B. C. 1359; S. B. F. G. 209.)

**Streptanthus**—continued.

annuals. Seeds should be sown in the open border, late in spring; or the seedlings may be reared on a gentle hotbed, and afterwards planted out.

**S. hyacinthoides** (Hyacinth-like). *fl.* deep bluish-purple; sepals lanceolate, acuminate; petals spatulate-linear, the limb reflexed. September. *l.* sessile, narrow below, but clasping, oblong-linear, acuminate. Stem simple or branching, 2ft. to 3ft. high. 1834. (B. M. 3516.)

**S. maculatus** (spotted).\* *fl.* very showy, in simple or paniced racemes; calyx purplish; petals deep velvety-purple in the middle, lighter towards the crenulate edge; pedicels 3in. to 4in. long, spreading. August. *l.* ovate-oblong, 3in. to 6in. long, glaucous, rather acute; cauline ones clasping by long and obtuse lobes. Stem 1½ft. or more high. 1833. (B. M. 3517, under name of *S. obtusifolium*.)

**STREPTIUM.** A synonym of **Priva** (which see).



FIG. 546. STREPTOCARPUS POLYANTHA, showing Habit and detached Flower.

**STREPTANTHUS** (from *streptos*, twisted, and *anthos*, a flower; alluding to the twisted claws of the petals in some species). ORD. *Cruciferae*. A genus comprising, according to Asa Gray, about thirteen species of hardy, glabrous, annual or perennial herbs, natives of mostly Western North America. Flowers purple, rarely white or yellow, ebracteate, rarely bracteate, sometimes pendulous; two or all of the sepals saccate at base, often coloured, sometimes very broad; petals unguiculate, the claw straight or twisted. Leaves entire, or the lower ones lyrate-pinnatifid; cauline ones sessile or amplexicaul. Two species have been introduced; both are

**STREPTOCARPUS** (from *streptos*, twisted, and *karpos*, a fruit; the capsule is spirally twisted). Cape Primrose. ORD. *Gesneraceae*. A genus comprising about a dozen species of pretty, stove or greenhouse, often villous or woolly herbs, sometimes stemless with spreading radical leaves, or rarely caulescent with opposite leaves (in some of the species, there is only one leaf in the adult state; this being, in reality, one of the cotyledons, which has developed to an enormous extent); they are natives of South and tropical Africa and Madagascar. Flowers pale, purplish, blue, or reddish, showy; calyx five-parted; corolla tube straight, declined, or incurved; limb ob-

**Streptocarpus**—*continued*.

liquely bilabiate, spreading, the posterior lobe bifid, the anterior and larger one trifid; perfect stamens two; peduncles scape-like or axillary, sometimes one or two-flowered, sometimes cymosely many-flowered; bracts small. Most of the species have been introduced. They thrive in any rich soil or vegetable mould; and may be readily increased by divisions, or by seeds. All are perennials, and, except where otherwise stated, natives of South Africa.

**S. bifloro-polyanthus** (hybrid). *fl.* pale lilac-blue; peduncles two to four-flowered. *l.* rosulate, oblong, rugose, crenate. 1882. Garden hybrid. Greenhouse. (F. d. S. 2429.)

**S. caulescens** (caulescent). *fl.* produced in pedunculate cymes; corolla pale lilac,  $\frac{1}{2}$  in. in diameter. Summer. *l.* in pairs, shortly stalked, elliptic, obtuse. Stem curious, gouty, hairy, giving off leafy branches. Eastern tropical Africa, 1885. Stove. (B. M. 6814.)

**S. Dunnii** (Dunn's).\* *fl.*  $\frac{1}{2}$  in. or more long, at length drooping; corolla pale or bright rose-coloured with a bright red tinge, between tubular and funnel-shaped, the lobes rounded; scapes six to eight or more, erect,  $\frac{1}{2}$  ft. high, bearing much-branched panicles. May and June. *l.* solitary,  $\frac{1}{2}$  ft. to  $\frac{3}{4}$  ft. long, sessile, horizontal and decurved, broadly oblong, obtuse, rounded at base, finely pubescent above, tomentose beneath. Stem very short. Transvaal, 1884. (B. M. 6903.)

**S. Gardeni** (Capt. Gardin's). *fl.* corolla  $\frac{2}{3}$  in. long; tube whitish or pale green, moderately curved downwards; limb pale lilac, the lower three lobes streaked with blood-colour; scapes two-flowered. Summer. *l.* all radical and pressed close to the earth, ovate-oblong, cordate at base, on rather short petioles, crenated, downy, crisped. *h.*  $\frac{6}{16}$  in. 1854. Allied to *S. Rexii*. Warm greenhouse. (B. M. 4862; F. d. S. 1214.)

**S. Greenii** (Green's). A free-flowering garden hybrid between *S. Rexii* and *S. Saundersii*, of dwarf, compact habit. 1882. Stove. (G. C. n. s., xvii., p. 303.)

**S. Kirkii** (Kirk's). *fl.* produced in loose, axillary, pedunculate cymes; corolla lilac,  $\frac{1}{2}$  in. long. Summer. *l.* petiolate, cordate-elliptic, obtuse, pubescent. Stem distinct, erect, pubescent. Eastern tropical Africa, 1884. Stove. (B. M. 6782.)

**S. parviflora** (small-flowered).\* *fl.* numerous, sub-paniculate; corolla white, with faint purplish streaks on the three lower lobes, the tube  $\frac{1}{2}$  in. long, the lobes  $\frac{1}{2}$  in. long; scapes longer or shorter than the leaves, slender, hairy. June. *l.* sub-erect, numerous, tufted,  $\frac{5}{16}$  in. to  $\frac{9}{16}$  in. long,  $\frac{1}{2}$  in. to  $\frac{2}{3}$  in. broad, sessile, oblong or ovate- or lanceolate-oblong, obtuse, crenulate, wrinkled, densely velvety. 1882. Greenhouse. (B. M. 6636.)

**S. polyantha** (many-flowered). *fl.* panicked; corolla pale blue,  $\frac{1}{2}$  in. long, the tube much curved, the limb very oblique, the lobes toothed; scapes one to three,  $\frac{1}{2}$  ft. or more high. Summer. *l.* few, about two pairs, pressed on the soil, unequal in size, one of the pair being  $\frac{1}{2}$  ft. long and the opposite one scarcely  $\frac{2}{3}$  in., both cordate-oblong, wrinkled, and downy. 1854. Greenhouse. See Fig. 546. (B. M. 4850; F. d. S. 1168; R. G. 206; R. H. 1862, 250.)

**S. Rexii** (Rex's).\* *fl.* bluish; calyx lobes slightly obtuse,  $\frac{1}{2}$  in. long; corolla  $\frac{1}{2}$  in. long; scapes bibracteate above the middle, one or sometimes two-flowered. June. *l.* all radical, prostrate, ovate-oblong, crenate, wrinkled, pubescent, much wrinkled and paler beneath. *h.*  $\frac{6}{16}$  in. 1824. Stove. (B. R. 1173; R. G. 204.) *Syn. Didymocarpus Rexii* (B. M. 5005; H. E. f. iii. 227.)

**S. Saundersii** (Saunders') \* *fl.* pale blue, drooping, on pedicels  $\frac{1}{2}$  in. long; corolla  $\frac{1}{2}$  in. long, funnel-shaped, the tube broad and nearly straight, the limb very oblique; cyme compound; scapes several. Summer. *l.* solitary, radical,  $\frac{1}{2}$  ft. long,  $\frac{8}{16}$  in. to  $\frac{9}{16}$  in. broad, cordate, obtuse, velvety, coarsely serrated, pale yellowish-green above, rose-purple and very tomentose beneath. *h.*  $\frac{1}{2}$  ft. 1860. Stove. (B. M. 5251; F. d. S. 1802; R. G. 826.)

**STREPTOPUS** (from *streptos*, twisted, and *pous*, a foot or stalk; alluding to the peduncles, which are abruptly bent or contorted near the middle). Twisted Stalk. *Syns. Hekorima, Hevorima.* ORD. *Liliaceae*. A genus comprising four species of greenhouse or hardy, perennial herbs, natives of Europe, temperate and mountainous Asia, or North America. Flowers medium, solitary or twin at the axils, nodding; perianth pink or whitish, campanulate or expanded, deciduous, the segments distinct or scarcely connate at base, sub-equal; stamens six; bracts minute or wanting. Leaves alternate, ovate or lanceolate, membranous, sessile or amplexicaul. Three of the species are in cultivation. They are interesting plants, of common culture in any light soil. Propagation may be easily effected by seeds, or by divisions.

**S. amplexicaulis** (stem-clasping). *fl.* on long peduncles, which are abruptly bent above the middle; perianth greenish-white,

**Streptopus**—*continued*.

the segments  $\frac{1}{2}$  in. long; anthers tapering to a point; stigma entire. June. *l.* very smooth, glaucous beneath, strongly stem-clasping. Stem  $\frac{2}{3}$  ft. to  $\frac{3}{4}$  ft. high, very smooth except at base. North America, Europe, &c. 1752. Hardy. *Syn. S. distortus*.

**S. distortus** (distorted). A synonym of *S. amplexicaulis*.

**S. roseus** (rosy).\* *fl.* perianth rose-purple, more than half the length of the slightly bent peduncle; anthers two-horned; stigma three-cleft. May. *l.* green on both sides, finely ciliated. Branches sparingly beset with short, bristly hairs. *h.*  $\frac{1}{2}$  ft. North America, 1806. Hardy. *Syn. Uvularia rosea* (B. M. 1489).

**S. simplex** (simple). *fl.* mostly solitary, rarely twin; perianth whitish, broadly funnel-shaped, five to six lines long; pedicels  $\frac{2}{3}$  in. to  $\frac{3}{4}$  in. long. June. *l.* oblong, acuminate, deeply cordate-amplexicaul,  $\frac{2}{3}$  in. to  $\frac{4}{5}$  in. long, glaucous beneath. *h.*  $\frac{2}{3}$  ft. to  $\frac{3}{4}$  ft. Nepal, 1822. Greenhouse.

**STREPTOSOLEN** (from *streptos*, twisted, and *solen*, a tube; referring to the form of the corolla-tube). ORD. *Solanaceae*. A monotypic genus. The species is a very handsome, greenhouse, evergreen, scabrous-pubescent shrub. It thrives in common soil, but prefers a sandy compost. Propagation may be effected by cuttings, inserted in sand, under a glass.

**S. Jamesonii** (Jameson's).\* *fl.* orange-coloured, pedicellate, disposed in terminal, corymbose panicles; calyx tubular-campanulate, shortly five-cleft; corolla tube elongated, spirally twisted below, enlarged above; limb of five broad, bilabiate lobes; perfect stamens four. June. *l.* entire, not very large, ovate, acute at both ends, bullate-rugose, on long petioles. *h.*  $\frac{4}{16}$  ft. Columbia, 1847. (G. C. n. s., xxi., p. 797; R. H. 1833, p. 36; B. M. 4605, F. d. S. 436 and P. M. B. xvi., p. 6, under name of *Brouallia Jamesonii*.)

**STRIATE**. Marked with fine longitudinal lines, streaks, or diminutive grooves or ridges.

**STRICT**. Very straight and upright.

**STRIGILIA**. A synonym of *Styrax* (which see).

**STRIGILLOSE**. Minutely strigose.

**STRIGOSE**. Beset with strigæ, *i.e.*, sharp, close-pressed, rigid hairs or bristles.

**STRINGY BARK TREE** See *Eucalyptus obliqua*. The name is also applied to several other species of *Eucalyptus*.

**STRIPED SQUILL**. See *Puschkinia scilloides*.

**STROBILA**. A synonym of *Arnebia* (which see).

**STROBILACEOUS, STROBILIFORM**. Relating to, or resembling, a strobile.

**STROBILANTHES** (from *strobilos*, a cone, and *anthos*, a flower; alluding to the form of the inflorescence, particularly when in a young state). Cone Head. Including *Goldfussia*. ORD. *Acanthaceae*. A large genus (about 180 species) of stove, usually erect herbs or subshrubs, for the most part natives of the East Indies, a few extending as far as China and Japan, and the Malayan Archipelago, and one being found in tropical Africa. Flowers blue, violet, or white, very rarely yellow, capitate, or in strobiliform or interrupted spikes, or panicked, sessile or sometimes pedicelled; calyx deeply and nearly equally five-cleft, or two-lipped, with one lip very shortly three-toothed; corolla tubular-ventricose, straight or curved, with five ovate or round, nearly equal lobes; stamens four or two; bracts and bracteoles large or small or absent. Leaves opposite, often unequal (in *S. anisophyllus* often apparently alternate), toothed or nearly entire, often bearing raphides. The species described below are very beautiful, stove subshrubs, all from India, and merit a place in every collection. They are of easy culture in any light soil. Propagation may be effected by cuttings, inserted in similar soil, under a glass, in heat.

**S. anisophyllus** (unequal-leaved).\* *fl.* lavender-colour; corolla  $\frac{1}{2}$  in. long; bracts elliptic, obtuse; heads small, often cymose. June. *l.* very unequal or pseudo-alternate, lanceolate, acuminate at both ends, glabrous,  $\frac{3}{4}$  in. long,  $\frac{1}{2}$  in. to  $\frac{1}{3}$  in. broad, the opposite leaf of each pair  $\frac{1}{2}$  in. long and  $\frac{1}{4}$  in. broad, or obsolete. *h.*  $\frac{2}{3}$  ft. to



**Strobilanthes**—continued.

3ft. 1823. SYNS. *Goldfussia anisophylla* (B. M. 3404), *Ruellia anisophylla* (H. E. F. 191), *R. persicifolia* (B. R. 955).

**S. consanguineus** (related). *fl.* blue, in compound, axillary and terminal spikes; corolla  $\frac{1}{2}$  in. long, the lobes ovate, acute. June. *l.* ovate, acuminate, obscurely toothed, glabrate, prominently lineolate above. *h.* 2ft. to 5ft. 1873.

**S. glomeratus** (clustered).\* *fl.* purplish; corolla  $\frac{1}{2}$  in. to  $\frac{2}{3}$  in. long, glabrous; heads ovoid; sub-sessile, hairy, often pseudo-axillary. November. *l.* ovate,  $\frac{4}{10}$  in. long, acute, serrated, narrowed or rounded at base, villous above, less so beneath; petioles  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long. *h.* 2ft. to 6ft. 1838. (B. 155, and B. M. 3831, under name of *Goldfussia glomerata*.)

**S. g. speciosus** (showy). *fl.* of a full, if not bright, purple, showy. (B. M. 4767, under name of *Goldfussia glomerata speciosa*.)

**S. isophyllus** (equal-leaved).\* *fl.* lavender-colour, similar to those of *S. anisophyllus*. Autumn. *l.* opposite, nearly equal, linear-lanceolate, attenuated at both ends, glabrous,  $\frac{3}{4}$  in. long; petioles  $\frac{1}{4}$  in. or less in length, or wanting. *h.* 1ft. to 2ft. 1845. (B. 244 and B. M. 4363, under name of *Goldfussia isophylla*.)

**S. Sabinianus** (Sabin's). *fl.* lavender-colour; corolla  $\frac{1}{2}$  in. long, curved, much ventricose, nearly glabrous; spikes  $\frac{2}{3}$  in. to  $\frac{4}{5}$  in. long, pubescent, mostly solitary. March. *l.* petiolate, broadly elliptic, shortly acuminate at both ends,  $\frac{6}{10}$  in. long, nearly entire; uppermost ones often sessile and cordate. *h.* 2ft. to 5ft. 1826. (B. R. 1238, under name of *Ruellia Sabiniana*.)

**S. scaber** (rough). *fl.* yellow; corolla symmetric,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, very hairy within; bracts  $\frac{1}{2}$  in. long; spikes  $\frac{1}{2}$  in. to  $\frac{2}{3}$  in. long, dense, often clustered, hairy. May. *l.* elliptic or obovate, acuminate,  $\frac{4}{10}$  in. long, coarsely scabrous or nearly smooth; petioles  $\frac{1}{2}$  in. long. *h.* 1ft. to 3ft. 1836. A pubescent or hairy shrub. (B. R. xxvii. 32.)

**S. sessilis** (sessile). *fl.* pale purple; corolla  $\frac{1}{2}$  in. long, nearly straight, slightly hairy within and without; spikes  $\frac{1}{2}$  in. to  $\frac{2}{3}$  in. long, cylindric, exactly strobiliform. April. *l.* sessile, ovate, acute, hairy,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, rounded or nearly cordate at base. Stems numerous, erect, 1ft. to  $\frac{1}{2}$  ft. high. 1833. (B. M. 3902.)

**S. Wallichii** (Wallich's).\* *fl.* blue, solitary or in pairs; corolla  $\frac{1}{2}$  in. long, nearly straight, with short, round segments; lower bracts leaf-like; spikes  $\frac{1}{2}$  in. to  $\frac{6}{10}$  in. long, often flexuous or zigzag. October. *l.* elliptic, acuminate,  $\frac{3}{10}$  in. long, puberulous or glabrous on petioles  $\frac{1}{2}$  in. long; upper ones sessile and cordate. *h.*  $\frac{6}{10}$  in. to 2ft. 1858. (B. M. 5119, under name of *Goldfussia Thomsonii*.)

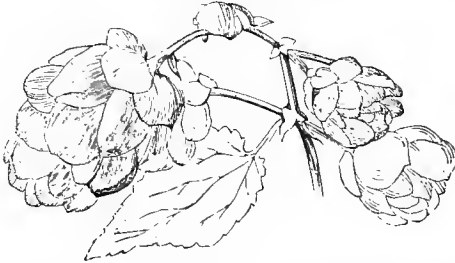


FIG. 547. OVAL STROBILES OF HOP, showing thin, membranous Bracts.

**STROBILE** (from *strobilos*, a Fir-cone). A scaly fruit, composed chiefly of a number of bracts that overlap one another like the slates on a roof. It is defined by Lindley as "an imbricated scaly inflorescence; a

**Strobile**—continued.

belong to the type called Catkins, and become Strobiles only when the seeds are approaching ripeness. The word Cone is employed with almost the same meaning as Strobile, though in general almost restricted to the fruits of the *Coniferae*, while the latter word also includes the fruits of the Hop, and of a few other plants.

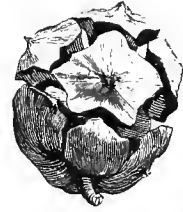


FIG. 549. ROUND STROBILE OR CONE OF CUPRESSUS, with the Scales separating, showing woody Bracts expanded into a shield-like Plate.

The Strobile is the result of the fertilisation of several flowers (there is usually one in the axil of each of the bracts of which it is composed); but the flowers are in most cases completely hidden from sight by the bracts. The latter become much enlarged as the seeds are



FIG. 550. FRUITING BRANCHLET OF JUNIPERUS COMMUNIS HIBERNICA, showing oval, berry-like Strobiles, sometimes called Galbulus.

ripening. They remain thin and membranous in some plants, e.g., Hop (see Fig. 547). Among the *Coniferae*, they usually become woody and hard; in some, e.g., *Cedrus* (see Fig. 548), they remain comparatively thin; but in others, e.g., *Cupressus* (see Fig. 549), each bract expands towards the tip into a broad, shield-like plate.

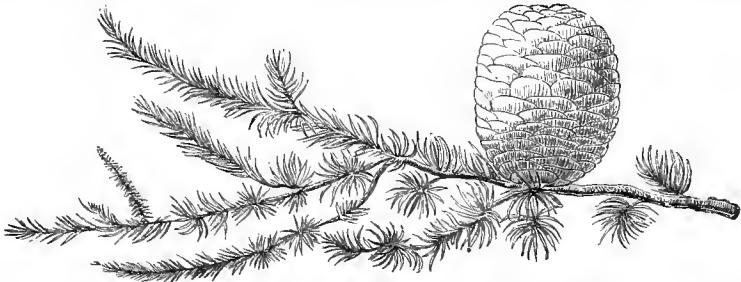


FIG. 548. FRUITING BRANCHLET OF CEDRUS LIBANI, bearing an oval Strobile or Cone, with thin, woody, imbricated Bracts.

collection of hard scales, representing distinct flowers, arranged spirally but closely imbricated;" but the term is seldom employed for the inflorescences, which rather

In the genus *Juniperus*, the bracts become soft and fleshy, and are united by their edges, so as to form a fruit which, at first sight, very much resembles a herry

**Strobile**—continued.

FIG. 551. FRUITING BRANCHLET OF *JUNIPERUS DRUPACEA*, showing rounded Strobiles, with fleshy Bracts, resembling Berries.

(see Figs. 550 and 551). This form is sometimes distinguished by the name of *Galbulus*. In *Coniferae*, the

**Strobile**—continued.

the true nature of the scales; but a widely-accepted view is that they represent two leaves, arising from an



FIG. 554. STROBILE OR CONE OF *SEQUOIA GIGANTEA*.

undeveloped branch in the axil of the bract, united together by one side, and that they correspond to open carpels.

As regards their forms, Strobiles are usually elongated cones, as, indeed, is implied in the equivalent term, Cone;

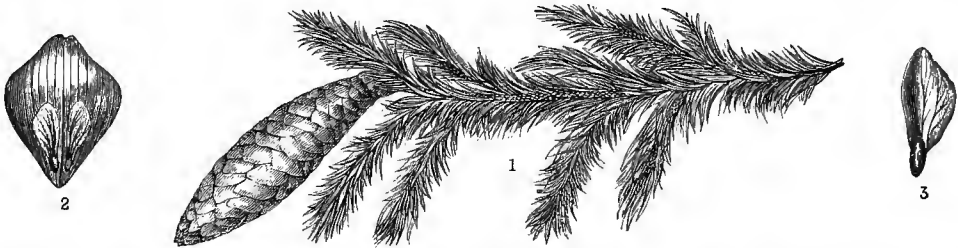


FIG. 552. *PICEA EXCELSA*, showing (1) Fruiting Branch, bearing slender Strobile, (2) Scale with Seeds in position, and (3) Seed.

seeds are not inclosed in carpels; but, in most, they lie, as represented in Fig. 552, in pairs, on the upper surface of scales, of which one is present in the axil of each bract. There has been much controversy about

but frequently they are oval or globular, and occasionally they are comparatively slender. Some of the commoner

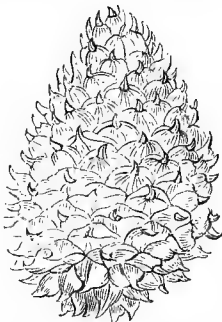


FIG. 553. STROBILE OR CONE OF *PINUS PUNGENS*.

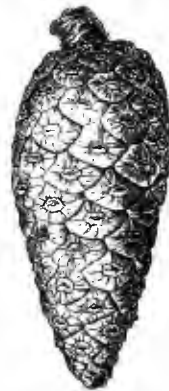


FIG. 555. STROBILE OR CONE OF *PINUS SYLVESTRIS*.

**Strobile**—continued.

forms are shown in the figures referred to above, and in those of *Pinus* and *Sequoia* (see Figs. 553, 554, and 555, the last being all conical).

**STROBILORACHIS** (from *strobilos*, a cone, and *rachis*, a flower-stem; alluding to the form of the inflorescence). ORD. *Acanthaceæ*. A small genus (two species) of stove, evergreen, Brazilian shrubs, now included, by the authors of the "Genera Plantarum," under *Aphelandra*. Bracts ample, slightly coriaceous, coloured; spikes long. For culture of *S. prismatica*, the only species which calls for description, see **Ruellia**.

**S. glabra** (smooth). A synonym of *S. prismatica*.

**S. prismatica** (prism-like). *fl.* yellow; corolla 1½ in. long, glabrous, funnel-shaped; bracts yellow, oval, 1 in. long, pungent-pointed, rigid. June. *l.* oblong, 9 in. to 12 in. long, 2½ in. to 3½ in. broad, acute at base, attenuated at apex; petioles 1½ in. long, glabrous. *h.* 2 ft. to 3 ft. SYN. *S. glabra*, *Hydromestus maculatus* (B. M. 4556).

**Stromanthe**—continued.

**S. amabilis** (lovely). *l.* deflexed, oblong-ovate, acuminate, unequal-sided, the surface ornamented by narrow bands of dark and light green in the direction of the veins, much broader spaces of silvery-grey intervening; petioles rather tall, cylindrical. 1875. A very ornamental foliage plant. (B. H. 1875, 15-17, f. 2.)

**S. Lubbersiana** (Lubbers'). *l.* oblong, acuminate, irregularly wedge-shaped at base, smooth, greyish beneath; upper surface prettily marbled with yellow, pale and dark green, in spots and irregular bands. 1880. A good foliage plant. (B. H. 1882, i.)

**S. Porteana** (Porte's). *fl.* spicate; spikes compound, solitary or twin; rachis geniculate, villous; bracts distichous, imbricated. *l.* ovate or lanceolate, pubescent or villous, of a pleasing green above, paler beneath. 1859. A handsome, dwarf plant.

**S. sanguinea** (bloody).\* The correct name of plant described in this work as *Phrynium sanguineum*. See Fig. 556. (F. d. S. 785.)

**S. spectabilis** (remarkable). *fl.* bracts, pedicels, and calyx deep red; corolla whitish; common peduncle slender, longer than the leaves; branchlets three to five, fascicled, sub-umbellate, compound-paniculate at apex. *l.* ovate-oblong, rounded at base, glabrous, of a pleasing green above, paler beneath. SYN. *Thalia spectabilis* (L. J. F. 401).



FIG. 556. STROMANTHE SANGUINEA, showing Habit and portion of detached Inflorescence.

**STROMANTHE** (from *stroma*, a couch, and *anthos*, a flower; alluding to the form of the inflorescence). SYN. *Maranta* (in part). ORD. *Scitamineæ*. A small Brazilian genus (three or four species) of handsome, stove perennials. Sepals three, free, oval-oblong, slender, equalling the corolla; petals three, slightly narrower than the sepals; bracts and bracteoles spathe-like, coloured, spreading; inflorescence borne on a long and rather loose peduncle, more or less compound, often branched from the base, rarely narrow and nearly racemiform, often wholly blood-coloured. Leaves petiolate, in very short sheaths. Stems leafy, erect, slightly branched, marked with long leaf-sheaths. For culture, see **Calathea**.

**STROMATOPTERIS**. Now included under *Gleichenia*.

**STROMBULIFEROUS, STROMBULIFORM**. Spirally twisted into a screw shape; e.g., the pods of some species of *Medicago*.

**STROPHANTHUS** (from *strophos*, a twisted cord or rope, and *anthos*, a flower; alluding to the produced corolla segments). ORD. *Apocynaceæ*. A genus comprising about eighteen species of stove or greenhouse, glabrous, pubescent, or villous shrubs or small trees, often climbing, natives of tropical Africa and Asia, one being found in South Africa. Flowers white, yellowish,

**Strophanthus**—*continued*.

orange, red, or purple, showy, rarely small; calyx five-parted; corolla funnel-shaped, the throat partly closed by ten scales; lobes five, twisted, usually produced into five very long, tail-like appendages; stamens affixed at the summit of the tube; cymes terminal, sometimes dense and few-flowered, sometimes corymbose and many-flowered. Leaves opposite, penninerved. All the species which have been introduced to cultivation are described below. They are both interesting and beautiful shrubs, of easy culture in a compost of sandy loam and peat. Propagation may be readily effected by cuttings, inserted in sand, under a glass, in a little heat.

**S. Bullenianus** (Bullen's). *fl.* salver-shaped, having a pinkish tube and a yellow limb marked with purplish spots, the long, tail-like apices of the limb segments being purple; cymes loosely branched. Summer. *l.* elliptic-oblong, on short petioles. Western tropical Africa, 1870. A hispid, stove climber. (G. C. 1870, p. 1471.)

**S. capensis** (Cape of Good Hope). *fl.* yellowish; corolla lobes  $\frac{1}{2}$  in. long; peduncles terminal, longer than the leaves, two to four-flowered. June. *l.* approximate, ternate, obversely lanceolate, obtuse or sub-acute,  $\frac{1}{2}$  in. long, attenuated into a petiole two lines long. Branches erect, glabrous. *h.* 3 ft. Cape of Good Hope, 1860. Greenhouse. (B. M. 5713.)

**S. dichotomus** (dichotomously-branched). *fl.* whitish; tails of corolla segments purple,  $\frac{3}{4}$  in. long; scales curled. February and March. *l.* oblong or oblong-obovate,  $\frac{1}{2}$  in. long, acute and narrowed at base, abruptly acuminate at apex; petioles three to four lines long. Branches and peduncles dichotomous. *h.* 3 ft. East Indies, 1816. Stove.

**S. divergens** (diverging). *fl.* greenish; throat of corolla striped with red, the lobes  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long; cymes few-flowered. June. *l.* elliptic-oblong, almost acute at both ends, mucronulate at apex, glabrous. *h.* 4 ft. China, 1816. Stove. (B. 150 and B. R. 469, under name of *S. dichotomus chinensis*.)

**S. sarmentosus** (sarmentose). *fl.* reddish-purple, fasciculate, lateral and terminal, or ternate; calyx lobes  $\frac{1}{2}$  in. long; lobes of the corolla nearly  $\frac{1}{2}$  in. long. June. *l.* elliptic, acuminate, slightly acute at the base. Branches cylindrical, sarmentose. *h.* 5 ft. Sierra Leone, 1824. Stove.

**STROPHIOLE.** A tubercle found surrounding the hilum of certain seeds.

**STROPHOLIRION** (from *strophos*, a twisted rope, and *lirion*, a lily; in allusion to the shape of the flower stem and the affinities of the plant). *SYN. Rupalleya.* *ORD. Liliaceæ.* A monotypic genus. The species, *S. californicum*, is the plant described in this work under the name of *Brodiaea volubilis*.

**STRUKERIA.** A synonym of *Vochysia* (which see).

**STRUMA.** A cushion-like swelling.

**STRUMARIA** (from *struma*, a tubercle; alluding to the style being swollen in the middle). *SYNS. Eudolon, Hymenotrom, Pugionella, Stylago.* *ORD. Amaryllideæ.* A genus of greenhouse, bulbous plants. Six species have been described, natives of South Africa. Flowers numerous, in an umbel, on filiform, scarcely spreading pedicels; perianth campanulate, with scarcely any tube, the segments equal, erecto-patent; filaments more or less connected; involucre bracts two, lanceolate, the inner ones smaller; scapes solid. Leaves loriform. A selection from the introduced species is given below. Several plants formerly included here will now be found under *Hessea*. The species thrive in well-drained, sandy loam, and, after the leaves begin to discolour, require a thorough season of rest. Propagated by division, or by seeds.

**S. angustifolia** (narrow-leaved). *fl.* scented like those of *Lilium Martagon*; perianth white, flesh-coloured outside, the segments equal and much-spreading; scape lateral, erect, umbellately about eight-flowered. April. *l.* few, linear, slightly obtuse, flat, entire, shining; sheath radical, erect, lin. to  $\frac{1}{2}$  in. high. *h.* 6 in. 1795.

**S. rubella** (reddish). *fl.* six to ten, umbellate, inodorous; perianth reddish and flesh-coloured, much spreading; bracts purplish; scape lateral, nearly 1 ft. high. May. *l.* linear,

**Strumaria**—*continued*.

oblique, slightly obtuse, entire, 5 in. to 9 in. long,  $\frac{1}{2}$  in. broad; sheath wanting. 1795.

**S. spiralis** (spiral). A synonym of *Carpolysa spiralis*.

**S. stellaris** (starry). A synonym of *Hessea stellaris*.

**S. truncata** (truncate). *fl.* many, umbellate, inodorous, on slender, erect pedicels; perianth white, reddish at base, the segments much spreading; bracts purplish, erect. April. *l.* tongue-like, obtuse, nearly erect, from 6 in. to 8 in. long,  $\frac{1}{2}$  in. broad, all included at base in a dark blood-coloured sheath. 1795.

**STRUMOSE, STRUMIFEROUS.** Bearing a struma.

**STRUTHIOLE** (from *struthion*, a little sparrow; alluding to the resemblance of the seeds to a beak). *SYN. Belvala.* *ORD. Thymelæacæ.* A genus comprising about a score species of pretty, greenhouse, evergreen, Heath-like shrubs or under-shrubs, restricted to South Africa. Flowers white, red, or yellow, sub-sessile in the upper axils, solitary or rarely twin; perianth tube slender, the lobes four, spreading; stamens four, included in the tube; bracteoles two, short, narrow, stipitate. Fruit small, dry. Leaves opposite or rarely scattered, rather small, coriaceous, often loosely imbricated. The best-known species are here described. They thrive in sandy peat. Propagation may be effected by cuttings, inserted in sand, under a glass.

**S. erecta** (erect). *fl.* pink or white, five to six lines long, the lobes acuminate. June. *l.* clustered, linear-lanceolate, acute, spreading, one to three-nerved at back, not ciliated. Branches slender, straight. *h.* 1 ft. 1798. Shrub highly glabrous. (B. M. 2138; L. B. C. 74.)

**S. lineariloba glabra** (linear-lobed, glabrous). *fl.* reddish or white, scarcely  $\frac{1}{2}$  in. long; lobes linear, obtuse. June. *l.* half-spreading, needle-like, convex at back, almost nerveless, glabrous. *h.* 2 ft. 1820. (B. M. 222, under name of *S. erecta*; L. B. C. 75, under name of *S. juniperina*.)

**S. longiflora** (long-flowered). *fl.* reddish or yellowish, densely tomentose, eight to twelve lines long; lobes ovate-oblong. July. *l.* imbricated, ovate- or linear-lanceolate, slightly acuminate, rather obtuse, slenderly striated, glabrous, ciliated, at length naked, one-half or one-third the length of the flowers. Branches puberulous. *h.* 2 ft. 1819. (B. M. 1212, under name of *S. pubescens*.)

**S. lucens** (shining). *fl.* yellow, five to seven lines long, pubescent; lobes ovate-oblong. June. *l.* imbricated, lanceolate or oblong, acuminate and acute, clasping, six to ten lines long, shining, ciliated, at length naked. Branches twiggy, pubescent above. *h.* 2 ft. 1817.

**S. ovata** (ovate). *fl.* white or flesh-coloured, several times longer than the leaves; lobes ovate, acuminate. April. *l.* ovate or oblong, slightly acute, nearly flat, obsoletely one to three-nerved at back. *h.* 2 ft. 1792. (A. B. R. 119; L. B. C. 141.)

**S. striata** (striated). *fl.* yellow, cano-pilose, scarcely longer than the leaves; lobes oblong, acute. July. *l.* ovate or oblong, sub-acute, flat, or the upper ones somewhat clasping, acute, striate-nerved, ciliated, glabrous. Branchlets pubescent. *h.* 2 ft. 1820. (A. B. R. 113, under name of *S. imbricata*.)

**S. tomentosa** (tomentose). *fl.* yellow, cano-tomentose,  $\frac{1}{2}$  in. long; lobes oblong, obtuse. August. *l.* imbricated, oval-oblong, rather obtuse, three to five lines long, three to five-nerved at back, slightly pilose; upper ones broader, half-clasping; lower ones flat, linear-lanceolate; young ones and branchlets densely cano-villous. *h.* 2 ft. 1799. (A. B. R. 334.)

**S. virgata** (twiggy). *fl.* red; tube adpressedly pilose; lobes ovate, rather obtuse. June. *l.* opposite, three to six lines long, clustered, semi-spreading, linear or lanceolate-linear, obtuse, ciliated, or, as well as the branchlets, pubescent. *h.* 2 ft. 1779. (A. B. R. 139, under name of *S. rubra*; A. B. R. 140, under name of *S. ciliata*.)

**S. v. incana** (hoary). *fl.* white; tube densely pubescent; limb glabrescent. *l.* ciliated, penicillate. Branchlets densely hoary or silky-villous at apex. (L. B. C. 11, under name of *S. incana*.)

**STRUTHIOPTERIS.** Included under *Onoclea* (which see).

**STRUTHIUM.** Included under *Gypsophila*.

**STRYCHNINE-PLANT.** The common name of *Strychnos Nux vomica*.

**STRYCHNOS** (an old Greek name used by Theophrastus for some solanaceous plants). *SYNS. Brehmia*,

**Strychnos**—continued.

*Ignatia*, *Lasiosstoma*, *Narda*, *Rouhamon*, *Unguacha*. ORD. *Loganiaceæ*. A genus comprising nearly sixty species of stove, evergreen trees and shrubs, often tall climbers, broadly dispersed over the tropics. Flowers small or rather long, usually white, cymose, four or five-parted; corolla lobes valvate. Fruit baccate, mostly globose, indehiscent. Leaves opposite, three to five-nerved at or above the base, membranous or coriaceous. "The species of *Strychnos* contain in the bark of their root and in their seeds two alkaloids (strychnine and brucine), combined with a peculiar acid (igasuric acid)—properties which are extremely energetic; their action on the nervous system is most powerful, whether as invaluable medicines or as mortal poisons. . . . The seeds of *S. Nuc vomica* act as a powerful excitant of the spinal cord and nerves, and stimulate the functions of the organs of voluntary motion, in cases of paralysis which do not proceed from injury to the brain, for which the seed itself, or an extract, or its alkaloid, strychnine, are employed. . . . *S. Ignatia* yields the Ignatius Bean of India, used as a remedy for cholera. *S. potatorum* yields the celebrated Clearing Nut of India, which clarifies foul water when this is put in a vessel of which the inside has been rubbed with it" (Le Maoût and Decaisne). *S. colubrina*, a native of Malabar, furnishes one kind of *lignum colubrinum*, or Snakewood. The pulp of the fruit of several members of this genus is edible. The species, of which about half-a-dozen have been introduced to cultivation, are of no particular value from a garden standpoint.

**STUARTIA** (named in honour of John Stuart, Lord Bute, 1713-1792, a zealous patron of botany). Spelt *Stewartia* by a few authors. Including *Malachodendron*. ORD. *Ternströmiaceæ*. A genus comprising only three species of beautiful, hardy shrubs; two of which are North American and the third Japanese. Flowers large or mediocre, solitary in the axils, shortly pedunculate; sepals and petals five, rarely six, the latter imbricated and cohering towards the base; stamens numerous. Leaves membranous, deciduous. The species given below merit a place in every collection of ornamental shrubs. Although sufficiently hardy to bear our winters in the open air, yet the young shoots often become injured by very severe weather, the summer not being long enough to thoroughly ripen the wood or bring the flowers to perfection; it is therefore advisable to keep the plants in the conservatory or cool greenhouse, except in favoured spots in the South of England, &c. Peat soil, mixed with a little loam, is the most suitable compost. Propagation may be readily effected by layering; or by means of ripened cuttings, inserted in sand, under a hand glass.

**S. grandiflora** (large-flowered). A synonym of *S. pseudo-camellia*.

**S. pentagyna** (five-styled)\* *fl.* cream-coloured, and, as well as the leaves, rather larger than in *S. virginica*; sepals and petals five or six, the latter obovate, with jagged edges; stamens longer than in *S. virginica*. May to July. *l.* oval, acute. *h.* 10ft. North America, 1785. (B. M. 3918.) SYN. *Malachodendron ovatum* (B. R. 1104).

**S. pseudo-camellia** (false Camellia). *fl.* creamy-white; sepals dull reddish-brown above, finely serrulate. Summer. *l.* oval-elliptic, shortly toothed, acuminate, narrowed at the base into the reddish petiole. Branches erect, flexuose. *h.* 12ft. Japan. SYN. *S. grandiflora* (E. H. 1879, 430).

**S. virginica** (Virginian)\* *fl.* white; sepals ovate; petals five, round-obovate, 1½ in. long. April and May. *l.* oblong-ovate, serrulate, softly downy beneath. *h.* 8ft. North America, 1743. (G. C. ser. ii., viii. 433; A. B. R. 73, under name of *S. marylandica*.)

**STUEWORT**. An old name for *Oxalis Acetosella*.

**STUPOSE**. Tow-like; furnished with mats or tufts of long hairs.

**STRUMIA**. A synonym of *Liparis* (which see).

**STYLAGO**. A synonym of *Strumaria* (which see).

**STYLANDRA**. A synonym of *Podostigma* (which see).

**STYLE** (from *stylos*, a column; in allusion to its form). The narrow portion of most carpels between the ovary and the stigma. Its use is to support the stigma in such a position as to favour pollination. The cells in its centre are very loosely arranged, and form what is called the "conducting tissue," for the passage of pollen tubes from the pollen grains on the stigma to the ovules in the interior of the ovary.

**STYLIDIEÆ**. A small natural order of herbs or rarely under-shrubs, chiefly Australian, a few species being found in tropical Asia, or in New Zealand and Antartotic America. Flowers hermaphrodite or very rarely unisexual, in terminal racemes or thyrsoid or corymbose panicles, rarely reduced to spikes or to single flowers, the primary inflorescence usually centripetal, the secondary often, or sometimes the whole, centrifugal; calyx tube adnate to the ovary, the limb of five divisions, all free or more or less united in two lips, the upper of three; corolla usually irregular, deeply divided into five lobes, of which one (the lowest), called the labellum, is much smaller than, or different from, the others, or rarely the corolla, as well as the calyx, regularly five or six-lobed; stamens two, the filaments connate with the style in a column free from the corolla. Capsule two-valved. Leaves radical or scattered, or collected in whorl-like tufts, entire, often narrow or small. The order embraces nearly 100 species; of these *Stylidium* absorbs eighty-four, and the remainder are classed under *Forstera*, *Levenhookia*, and *Phyllachne*.

**STYLIDIUM** (from *stylos*, a column; the stamens and styles are joined). SYN. *Candollea* (of Labillardière), *Ventenatia*. ORD. *Stylidiæ*. A genus comprising eighty-four species of beautiful but rare, greenhouse, herbaceous perennials, of which one is a native of the East Indies, and the rest are Australian (one being also dispersed over tropical Asia). Flowers in racemes, panicles, or corymbose cymes, on terminal peduncles or radical scapes; calyx lobes five, more or less united in two lips; corolla irregular, one of the lobes (labellum) much smaller and turned down, or rarely nearly as long and curved upwards, the other four ascending in pairs; column elongated and bent down or folded, elastic. Fruit a two-celled capsule, globose, linear, or lanceolate. The species best-known to cultivation are described below. They thrive in a compost of sandy loam and peat. Propagation may be effected by seeds, or, in a few cases, by division of the roots; the few shrubby kinds may be increased by cuttings.

**S. adnatum** (adhering). *fl.* pink, in nearly sessile clusters along the rachis; spike-like panicles or compound racemes dense, usually rather short and nearly sessile, but sometimes 6 in. to 10 in. long. July. *l.* scattered along the stem; upper ones crowded in a terminal, whorl-like tuft, linear, but sometimes all very narrow, in other specimens rather broad, and from ¼ in. to 1½ in. long. Stems 2 in. to nearly 12 in. long. 1824. (B. M. 3816 and B. R. 1459, under name of *S. fasciculatum*.)

**S. a. abbreviatum** (shortened). *fl.*, inflorescence rarely above 2 in. long and very dense. *l.* narrow or broad. (B. M. 2598, and B. R. 914, under name of *S. adnatum*.)

**S. armeria** (Armeria-like). A synonym of *S. graminifolium*.

**S. Brunonianum** (Brown's). *fl.* pink; calyx lobes free; corolla with appendages to the throat; raceme loose, 2 in. to 4 in. long, many-flowered; scapes 1 ft. to 1½ ft. long, with two to five whorls of narrow leaves. June. *l.*, radical ones linear to oblanceolate, acute or rarely almost obtuse, 1 in. to 2 in. or more long, rather flaccid. 1841. (B. R. 1841, 15.)

**S. bulbiferum macrocarpum** (bulb-bearing, large-fruited)\* *fl.* greenish-purple; calyx lobes free, very obtuse; corolla without appendages; scapes or pedicels ¼ in. to 2 in. long, with a loose, almost corymbose raceme of three to seven flowers. May. *fr.* almost sessile, eight to nine lines long. *l.* very narrow-linear, scarcely acute, ¼ in. to over ½ in. long, densely tufted at the ends

**Styloidium**—continued.

and bases of the branches. *h.* 6 in. 1840. (B. M. 3913, under name of *S. recurvum*.)

**S. ciliatum** (ciliated). *fl.* yellow or sometimes white or pink; corolla variable in size, the appendages small or wanting; panicle or raceme short and pyramidal or narrow and 3 in. to 4 in. long; scape 6 in. to 12 in. high. June. *l.* linear, lin. to 1½ in. long, terminating in a hair-like point. 1842. (B. M. 3883; B. M. 4529 and L. J. F. 34, under name of *S. saxifragoides*.)

**S. dichotomum** (dichotomous). *fl.* yellow, in a more or less thyrsoid panicle or compound raceme; scapes 2 in. to 4 in. high, glandular-pubescent. April. *l.* crowded at the bases and ends of the branches, and scattered between the tufts, sometimes lin. or more long, narrow-linear, acute. 1850. (B. M. 4538, F. d. S. 606, and L. J. F. 59, under name of *S. mucronifolium*; F. d. S. 229, under name of *S. Hookeri*.)

**S. graminifolium** (Grass-leaved).\* Grass-leaved Trigger Plant. *fl.* pink, nearly sessile or shortly pedicellate; corolla lobes nearly equal, the lip rather long; scapes 6 in. to 18 in. high, bearing a narrow, simple raceme or interrupted spike. July. *l.* linear, rather rigid, acute or obtuse, nearly flat, variable in breadth, 2 in. to 6 in. or even 9 in. long, sometimes cartilaginously denticulate on the margins. 1803. (B. M. 1918; B. R. 90.) *S. armeria* (L. J. F. 286) is a form with broad leaves.

**S. hirsutum** (hairy). *fl.* pink or red, nearly sessile, forming a dense, oblong, spike-like raceme, rarely above lin. long, very hairy; larger corolla lobes nearly equal; lip with crisped margins and usually short appendages; scapes 6 in. to over 12 in. high, with spreading hairs. June. *l.* narrow-linear, acutely acuminate, 2 in. to 6 in. or 8 in. long, glabrous or glandular-pubescent. 1830. (B. M. 3194.)

**S. Hookeri** (Hooker's). A synonym of *S. dichotomum*.

**S. loricifolium** (Larch-leaved). *fl.* pink; corolla with appendages to the lip, but usually none to the throat; panicle or raceme loose, pedunculate, often above 6 in. long. July. *l.* scattered but rather crowded along the branches, not collected in terminal tufts, narrow-linear, mucronate, ½ in. to lin. long. *h.* 1 ft. 1818. Sub-shrub. (B. R. 550; H. E. F. 32; B. M. 2249, under name of *S. ternifolium*.)

**S. mucronifolium** (mucronate-leaved). A synonym of *S. dichotomum*.

**S. reduplicatum** (reduplicate). *fl.* yellowish-white or pale pink, the lower ones on long pedicels; two larger corolla lobes ½ in. to ¾ in. long, connate to the middle; raceme short, loose; scapes leafless, 6 in. to 1½ ft. long, with spreading hairs. November. *l.* all radical, linear, acuminate, narrowed into long petioles, broad and nearly flat to narrow with revolute margins, 3 in. or 4 in. to nearly 12 in. long, glabrous or minutely glandular-pubescent. 1841. (B. 213, under name of *S. Drummondii*; B. R. 1842, 41, under name of *S. pilosum*.)

**S. saxifragoides** (Saxifrage-like). A synonym of *S. ciliatum*.

**S. scandens** (climbing). *fl.* pink; corolla with more or less prominent appendages to the throat and lip; racemes terminal, solitary or two or three together, shortly pedunculate. June. *l.* all collected in dense, whorl-like, distant tufts, linear, lin. to 2 in. or more long. *h.* 2 ft. 1803. Climber. (B. M. 3136; P. M. B. xv. p. 149.)

**S. spatulatum** (spatulate)\*. *fl.* pale yellow, small; corolla with appendages to both throat and lip; racemes loose, simple, elongated; scapes glabrous or pubescent, sometimes 1½ ft. high. Summer. *l.* radical, rosulate, obovate to oblong-spatulate, obtuse or acute, more or less pubescent or sprinkled with glandular hairs on both sides, ½ in. to 1½ in. long, including the petiole. *h.* 6 in. 1872. (B. M. 5953.)

**STYLDIUM** (of Loureiro). A synonym of **Marlea** (which see).

**STYLIFEROUS**. Style-bearing.

**STYLIFORM**. Style-shaped.

**STYLMNUS**. A synonym of **Pluchea** (which see).

**STYLIS**. A synonym of **Marlea** (which see.)

**STYLOCORYNE** (of Cavanilles). A synonym of **Randia** (which see).

**STYLOGLOSSUM**. A synonym of **Calanthe** (which see).

**STYLOLEPIS**. Included under **Podolepis** (which see).

**STYLOPHORUM** (from *stylos*, a style, and *phero*, I bear; indicating one of the distinctive characters). ORD. *Papaveraceae*. A genus comprising three species of hardy herbs (nearly allied to *Chelidonium*, from which they principally differ in habit), with perennial rhizomes and yellow juice; one is North American, a second is Himalayan, and the third is found in Mandschuria and

**Stylophorum**—continued.

Japan. Flowers yellow or red; sepals two; petals four; stamens numerous; peduncles elongated, solitary or sub-fasciculate, at length nodding. Radical leaves pinnatifid or absent; cauline ones few, alternate, or the floral ones nearly opposite, lobed or dissected. Two species have been introduced to this country. They thrive in any light garden soil. Propagation may be effected by seeds, sown in the open border, during April; or by divisions of the root.

**S. diphyllum** (two-leaved)\*. Celandine Poppy. *fl.* deep yellow, 2 in. broad; peduncles equalling the petioles. May. *l.* pale or glaucous beneath, smoothish, deeply pinnatifid into five or seven oblong, sinuate-lobed divisions; radical leaves often with a pair of smaller and distinct leaflets. *h.* 1 ft. North-west America, 1854. The foliage and flower resemble Celandine. (B. M. 4867.) SYN. *S. ohioense*.

**S. japonicum** (Japanese). *fl.* yellow, axillary, Poppy-like. May. *l.* radical ones long-stalked, pinnatisect. Stem slender, 1 ft. to 1½ ft. high, two or three-leaved. Japan and North-eastern Asia, 1870. An elegant plant. (B. M. 5830.) SYN. *Chelidonium japonicum*.

**S. ohioense** (Ohio). A synonym of *S. diphyllum*.

**STYLOPODIUM**. A term applied to an enlargement of a disk-like expansion at the base of a style, as in *Umbelliferae*.

**STYLOSANTHES** (from *stylos*, a style, and *anthos*, a flower; alluding to the very long style). Pencil Flower. ORD. *Leguminosae*. A genus comprising about fifteen species of stove or greenhouse, perennial herbs, natives of Asia, Africa, North America, and Brazil. Flowers yellow (or white?), variously disposed; calyx tube filiform, with membranous lobes; petals and stamens inserted at the apex of the tube; standard orbicular. Leaves pinnately trifoliate, exstipellate; stipules adnate to the bases of the petioles. Several of the species have been introduced, but they are scarcely worthy of cultivation, except in botanical collections.

**STYLURUS**. Included under **Grevillea** (which see).

**STYPANDRA** (from *stypa*, tow, and *aner*, andros, an anther; alluding to the downy appearance of the stamens). ORD. *Liliaceae*. A small genus (three species) of greenhouse half-hardy, perennial herbs, with fibrous roots, natives of Australia. Flowers blue, in a very loose, terminal, dichotomous cyme; perianth at length deciduous, of six spreading segments, all equal or the inner ones broader; stamens six; pedicels filiform; bracts minute or none, or the lower ones leaf-like in the leafy species. Leaves either all radical or distichously spreading on the stem. Stem erect or ascending, sometimes woody at base. The species will succeed in an unheated pit or warm border outside, if protected in severe weather. A compost of sandy loam and peat is suited to their requirements. Increased by divisions.

**S. caespitosa** (tufted). *fl.* on erect pedicels, lin. to 2 in. long, usually three or four in an umbel; perianth blue or yellowish inside, or rarely white, erect, the segments nearly ½ in. long. June. *l.* mostly radical, with very short, distichous sheaths, erect, rigid, 6 in. to 12 in. long, ½ in. to ¾ in. broad. Stems erect, 1 ft. to 2 ft. high. 1824.

**S. glauca** (glaucous). *fl.* in a loose cyme, usually leafy at base; perianth blue, the segments very acute, about ½ in. long; pedicels recurved, ½ in. to lin. long, mostly solitary. June. *l.* distichous, the sheaths usually concealing the stem, erect or spreading, linear or lanceolate, usually 3 in. to 4 in., but sometimes 6 in. to 8 in. long, two to four lines broad. Stems low or ascending, 1 ft. to 3 ft. high. 1823. (B. M. 3417, under name of *S. propinqua*.)

**S. umbellata** (umbellate). *fl.*, perianth segments white or yellowish, about five lines long. June. *l.* radical ones numerous, 5 in. to 8 in. long, one to two lines broad. Stems 8 in. to 10 in. high, including the inflorescence, which is often reduced to a single umbel of two to four flowers on a simple scape. 1826. Very nearly allied to *S. caespitosa*.

**STYPHELIA** (from *stypheilos*, hard; alluding to the habit of the species). ORD. *Epacrideae*. A genus comprising eleven species of beautiful, greenhouse, ever-green, erect or decumbent shrubs, confined to Australia.



**Styphelia**—continued.

Flowers axillary, solitary with the rudiment of a second, or very rarely two or three, on a very short peduncle; calyx usually coloured, five-parted, many-bracted, bibracteolate; corolla tube elongated, cylindrical or slightly ventricose, hairy inside at the throat; lobes five, linear, much revolute; stamens five, free. Leaves sessile or scarcely petiolate, small or elongated, acuminate, striate-nerved. The four best-known species are here described. Young plants are obtained from cuttings, in a similar way to *Ericas*; but, as the process takes a long time, it is advisable to purchase small plants from nurserymen. A compost of fibry peat, with the addition of about one-sixth of silver sand, is most suitable for these plants. Efficient drainage must be secured, and the new soil made firm round the ball, which should not be broken, nor the roots disturbed by the process. Water should be withheld from the roots for a few days, light overhead syringings being sufficient. As the plants progress, more air and sun should be admitted, until about the end of July, when they may be plunged in ashes outside. Watering should be carefully performed at all times. A cool greenhouse, or other structure where frost is excluded, is a suitable position for them in winter.

**S. amplexicaulis** (stem-clasping). A synonym of *Leucopogon amplexicaulis*.

**S. longifolia** (long-leaved). *fl.* green, solitary, axillary, nearly sessile; corolla tube nearly lin. long, with five dense tufts of hairs above the base. June. *l.* long-lanceolate, gradually tapering into a fine, rigid point, concave, lin. to 2in. long, or the lower ones still longer. Branches twiggly, softly pubescent. *h.* 3ft. 1807. (B. R. 24; L. B. C. 1583.)

**S. triflora** (three-flowered). *fl.* pale pink and yellow, very shortly pedicellate, solitary or very rarely two (or three?) together in the lower axils; corolla tube usually about 3in. long. July. *l.* obovate-oblong to oblong-lanceolate, very shortly tapering to a rigid point, flat or more or less concave, rarely exceeding lin. in length. *h.* 5ft. 1796. (A. B. R. 72; B. M. 1297; L. B. C. 426.)

**S. tubiflora** (tube-flowered).\* *fl.* red, solitary in the axils, nearly sessile or shortly pedicellate; corolla tube nearly lin. long, the revolute lobes very long and narrow. July. *l.* oblong-linear, sometimes slightly cuneate, abruptly mucronate, with revolute margins, about 3in. long. *h.* 5ft. 1802. (B. 142; L. B. C. 1938; P. M. B. xii. 29.)

**S. viridis** (green). *fl.* green, solitary in the axils, nearly sessile; corolla tube nearly 3in. long, with five tufts of hairs inside above the base. May. *l.* oblong-lanceolate or obovate-oblong, abruptly narrowed into a short, rigid point, flat or slightly convex, less than lin. long. *h.* 4ft. 1791. (A. B. R. 312; S. F. A. 50, under name of *S. viridiflora*.)

**STYPHNOLOBIUM**. Included under *Sophora* (which see).

**STYRACEÆ**. A natural order of trees or shrubs, mostly natives of the warmer parts of Asia, Australia, and America, a few being found in Northern temperate regions. Flowers usually white, rarely reddish, regular, hermaphrodite or rarely polygamo-dioecious, usually racemose; calyx gamosepalous, with five, rarely four, teeth or lobes; corolla of five, rarely four, petals, free or connate towards the base; stamens as many, or twice as many, as the corolla lobes, sometimes indefinite; disk wanting; bracts small, often minute or obsolete; pedicels ebracteolate. Fruit often baccate or drupaceous, one-seeded by abortion. Leaves alternate, exstipulate (or with minute rudimentary stipules?), entire or serrated, membranous or coriaceous, pinniveined. The two balsams, Storax and Benzoin, are respectively derived from *Styrax officinalis* and *S. Benzoin*. Several of the species are employed as tea and for dyeing yellow in the Himalayas. The order embraces seven genera and about 220 species. *Styrax* and *Symplocos* are the principal genera, and include all the species, except about a dozen.

**STYRANDRA**. A synonym of *Maianthemum* (which see).

**STYRAX** (the ancient Greek name, used by Theophrastus, for the tree which produces Storax). Storax.

**Styrax**—continued.

**SYNS.** *Cyrta*, *Foveolaria*, *Strigilia*, *Tremanthus*. **ORD.** *Styraceæ*. A genus comprising nearly sixty species of greenhouse or hardy, mostly lepidote, trees and shrubs, natives of the warmer parts of Asia and America, a few being found in temperate Asia and Europe. Flowers often white, disposed in axillary and terminal, short, loose, simple or slightly-branched racemes, often pendulous; calyx campanulate, minutely five-toothed or nearly entire; corolla segments or petals five, erectopatent; stamens ten. Fruit globose or oblong; seeds, by abortion, one, or very rarely two. Leaves entire or serrated. *S. Benzoin* yields the resin called Benzoin; and *S. officinale* furnishes a balsamic resinous substance, known as Storax. The few species introduced are (except where otherwise stated) hardy, deciduous, white-flowered shrubs; they are very handsome subjects when in flower, and hence are highly suited for shrubberies. A light soil is most suitable. Propagation may be effected by layers, in spring or autumn.

**S. americana** (American). *fl.* solitary or in very few-flowered racemes, nodding; petals lanceolate-oblong, 3in. to nearly 4in. long. Summer. *l.* lin. to 3in. long, bright green, commonly entire, oblong or oval, mostly acute at both ends, often acuminate. *h.* 4ft. to 8ft. North America.

**S. Benzoin** (Benzoin). *fl.* 3in. long; pedicels thrice as long as the flowers; racemes compound, axillary, rather shorter than the leaves, hoary-tomentose. Summer. *fr.* globose, indehiscent, seven lines broad. *l.* 4in. long, oblong, acuminate, white-tomentose beneath. Branchlets covered with rusty-white tomentum. Sumatra. Stove. (B. M. Pl. 169.)

**S. californica** (Californian). *fl.*, pedicels with the calyx and corolla minutely caescent; style becoming lin. long. *fr.* a bony seed, the size of a small cherry. *l.* oval, entire or sparingly undulate, lin. to 2in. long, short-petioled. *h.* 5ft. to 8ft. California. A shrub with scurfy, stellular pubescence, at first hoary, sometimes soon green and glabrate.

**S. grandifolia** (large-leaved).\* *fl.* mostly in elongated racemes; corolla 3in. long, convolute-imbriate in bud. Spring. *l.* obovate, acute or pointed, 3in. to 6in. long, white-tomentose beneath. *h.* 6ft. North America, 1765. (L. B. C. 1016.)

**S. japonica** (Japanese). A form of *S. serrulata virgata*.

**S. officinalis** (official). *fl.*, corolla often six or seven-parted; racemes shorter than the leaves, three to five-flowered. July. *l.* oval-obovate, 1 1/2in. to 2in. long, often rounded at apex, sub-acute at base, hoary-tomentose beneath. *h.* 10ft. Levant (naturalised in South-western Europe), 1597. (A. B. R. 631; Pl. Ment. 60; L. B. C. 928.)

**S. pulverulenta** (powdery). *fl.* 1 1/2in. long, one to three together in the axils and at the tips of the branches, fragrant. Spring. *l.* oval or obovate, about lin. long, sparingly puberulous above, scurfy-tomentose beneath. *h.* 1ft. to 4ft. South United States, 1794.

**S. serrulata** (slightly serrated).\* *fl.*, corolla five or six-lobed, pubescent; racemes terminating the lateral branches, shorter than the leaves. Spring. *l.* oblong, acuminate, 2 1/2in. long, acute at base, serrulated, glabrescent. Branches, petioles, racemes, and calyces fulvous-tomentose. India to Japan. A shrub or tree, sometimes 40ft. high. (B. M. 5950.)

**S. s. virgata** (twiggy). *l.* tapering, acuminate, usually widest below the middle. *S. japonica* (E. G. 583; S. Z. F. J. 23) only differs from this variety in having somewhat pinkish-tinted buds, with a glabrescent calyx.

**SUEDA** (from *Suaed*, said to be the Arabic name of one of the species). **ORD.** *Chenopodiaceæ*. A genus comprising about forty species of saline herbs or shrubs, widely distributed. Flowers small or minute, axillary or clustered. Leaves ternate, fleshy, entire. *S. fruticosa* and *S. maritima* (Sea Blite; Seaside Goosefoot, &c.) are British plants; the latter is used in Southern Europe in the manufacture of Barilla (see remarks under **Salicornia**). None of the species possess any horticultural merit.

**SUB.** A prefix which, in composition of Latin words in terminology, signifies nearly, somewhat, or slightly: e.g., Sub-retund, roundish; Sub-cordate, slightly cordate, &c.

**SUBEROSE**. Corky in texture.

**SUBLIMIA**. A synonym of *Hyophorbe*.

**SUBMERGED, SUBMERSED.** Growing under water.

**SUB-PETIOLAR.** Beneath the petiole.

**SUBSOIL.** The layer of soil existing at such a depth below the surface that it is not reached in the usual operations of gardening and agriculture, i.e., from about 1ft. below the surface downwards. In some localities, the Subsoil is of almost the same composition as the soil; but there is usually a considerable difference between them. Nor is it difficult to understand why this should be the case, in so far, at least, as regards the proportion of organic matter, and of the soluble foods of plants, in each; for plants draw a large share of their nourishment from the surface soil, and thus impoverish it of the substances used by them. On the other hand, such plants as die and decay on any piece of ground increase the proportion of organic matter in the surface soil, but add little, if any, to the Subsoil. The physical texture of the surface soil is also rendered more open by the numerous roots that traverse it; and this greater looseness is much increased by the operations of cultivation. The freer access of air and rain thus afforded permits a more rapid decomposition of the soil. The looser texture also permits rain-water to trickle down till it reaches the Subsoil, carrying with it soluble compounds out of the surface soil. If the Subsoil is clay, it retains what is carried down in this way, whether such additions are useful as food for plants, or poisonous to them. Hence, the Subsoil may become rich, so as to yield excellent crops when exposed to air and light; or it may be almost barren until the poisonous substances in it (e.g., Oxides of Iron) have been changed, by the action of natural agents, such as air and rain, or by the operations of agriculture, into harmless compounds.

The nature of the Subsoil exercises a very important influence on the fertility of the surface soil. If it is open and sandy, it allows the rain-water to drain away rapidly; hence, there is no reserve, in times of drought, to supply the place of that evaporated from the surface of the soil, and from the plants thereon, which suffer in their growth, or perish for lack of water. If, on the other hand, the Subsoil is clay impervious to water, the rain is caught, and collects in hollows, where it stagnates, with the usual ill-consequences of the surface soil becoming saturated and cold, and being rendered sour by the formation in it of organic acids, from the action of the water on decaying plant-remains. Clay Subsoils must, therefore, be broken up by the Subsoil plough, or by the spade and fork; but they should be well drained about one or two years before they are broken up, as wet clay coheres very quickly if merely cut through. Excellent results often follow the bringing of the Subsoil to the surface, by means of Subsoil ploughs or spades; and it is evident, from what is said above, that it must be an advantage to bring within reach of the roots of plants new soil, richly supplied with substances required by them, and that have been used up, to some extent, in the surface soil. Moreover, the new soil, when exposed to the atmosphere and frost, breaks up, and affords new food supplies, in addition to those washed into it by rain from the higher layers.

Where the Subsoil contains poisonous substances, it should not be disturbed, unless it is possible to let the ground lie fallow for a year or more. In this time, the danger will probably be removed by the action of the atmosphere upon the hurtful substances. To ascertain whether the Subsoil is hurtful, the following method has been employed: A flower-pot is filled with the Subsoil to be tried, and another is filled with ordinary soil, for comparison of results. Seed of the same kind is sown in both, and, if the Subsoil gives a good crop, this shows it to be safe, and worth bringing to the surface; but,

**Subsoil—continued.**

if the crop is sickly and weak in the Subsoil, while good in the other pot, the Subsoil is evidently unwholesome in its natural state, though it may be rendered fertile by exposure, for a time, on the surface.

**SUB-SPECIES.** A rank higher than that of Variety, but lower than that of Species.

**SUB-TROPICAL GARDEN.** A term applied to a portion of a flower garden or pleasure-ground devoted, during summer, to stately-habited foliage plants, which are arranged with a view to represent tropical vegetation. Many of the plants used are natives of tropical countries, and are, consequently, only available for placing outside during the hottest part of the year; but there are others of stately aspect which are quite hardy, and are invaluable for associating with them. Tropical plants of slow growth, which have to be kept under glass all the winter, require a great deal more space than can generally be afforded them; and as they are also very expensive subjects to procure in the first place, comparatively few gardeners have any at their command. One of the most important provisions for sub-tropical plants is shelter; their leaves in most instances are soon torn, and the plants disfigured, if exposed to rough winds. Shade and moisture are also necessary for many Tree and other Ferns and Cycads. There are numerous sub-tropical plants which may readily be raised from seed each spring, as they are quick-growing, and form quite large specimens before autumn, when planted out about the middle of June, in rich soil. Of these *Albizia lophantha*, Castor-oil plants (*Ricinus*) in variety, Nicotianas, Solanums, Wigandias, and varieties of *Zea* are specially valuable. Cannas, too, may readily be raised from seeds in spring; but the plants are nearly hardy, and may afterwards be increased by division of the rootstock in spring. Of tropical plants the most serviceable are: amongst Palms—*Chamærops humilis*, *Livistona australis*, *L. chinensis*, *Phoenix dactylifera*, *Ptychosperma Cunninghamiana* (often known in gardens as *Seaforthia elegans*), *Trachycarpus excelsus* and *T. Fortunei*. Musas—*M. Ensete* and *M. superba*. Tree Ferns—*Alsophila australis* and *A. excelsa*, *Cyathea dealbata*, *Dicksonia antarctica*. *Cycas circinalis* and *C. revoluta* may be plunged in sheltered positions along with the plants above-mentioned. Amongst other subjects also available are Arundinarias, Bambusas, Centaureas, Cordylines, Erythras, Fatsias, three or four species of *Ficus*, Funkias, the New Zealand Flax (*Phormium tenax*), Pampas Grass, &c. Other remarks on this subject will be found under **Garden**, and the descriptions and culture of plants referred to are given under their respective headings.

**SUBULARIA** (from *subula*, an awl; alluding to the form of the leaves). Awlwort. ORD. *Cruciferae*. A monotypic genus. The species, *S. aquatica*, is an annual, aquatic herb, indigenous in Europe (Britain), Siberia, and North America. It has no value as a garden subject.

**SUBULATE, SUBULIFORM.** Awl-shaped.

**SUCCISA.** Included under *Cephalaria* and *Scabiosa*.

**SUCCISE.** Abruptly cut or broken off at the lower end.

**SUCCORY.** Another name for **Chicory** (which see).

**SUCCOVIA** (named after Professor Geo. Suckow 1751-1813, a botanist of Heidelberg). ORD. *Cruciferae*. A monotypic genus. The species, *S. baccarica*, an annual, with yellow flowers and pinnatisect leaves, native of the Canary Islands and the Mediterranean region, is probably not now in cultivation.

**SUCCUBOUS.** When, in leaves crowded on a stem, the base of each leaf covers the apex of the next below.

**SUCCULENT.** Very cellular and juicy.

**SUCCULENT PLANTS.** Amongst these are included numerous genera of plants which are extremely varied in habit, but mostly all have leaves of a soft, succulent nature. Very few are hardy subjects compared with those which need glass protection: still, a large number require but little artificial warmth. The natural order *Cactææ* includes a large proportion of Succulent Plants, many being exceedingly curious, and others very beautiful. The following are representative genera amongst Succulents: *Agave*, *Aloe*, *Cereus*, *Cotyledon*, *Crassula*, *Echinocactus*, *Epiphyllum*, *Gasteria*, *Haworthia*, *Mammillaria*, *Mesembryanthemum*, *Opuntia*, *Phyllocactus*, *Sedum*, *Sempervivum*. For carpet-bedding purposes, some of the dwarf Succulents are invaluable—as, for example, *Sedums*, &c.

**SUCCUTA.** A synonym of *Cuscuta*.

**SUCKER.** A shoot of underground origin.

**SUCKERING IRON.** A garden tool used for removing suckers from fruit-trees, &c. It consists of a narrow, steeled blade, to which a shank and socket are attached, wherein to insert a handle somewhat like that of a spade. The entire length is about the same as that of the latter implement, but the blade is usually only 6in. long by 3in. broad, at the cutting edge. The handle is much shorter, and the shank and socket, combined, longer.

**SUCKERS, PROPAGATION BY.** See *Propagation*.

**SUFFRUTESCENT.** Slightly shrubby.

**SUFFRUTICOSE.** Low and shrubby at base.

**SUGAR BERRY.** The fruit of *Celtis occidentalis*.

**SUGAR BUSH.** A common name for *Protea mellifera* (which see).

**SUGAR CANE.** The popular name for *Saccharum officinarum* (which see).

**SUGAR PEA.** A name given to edible-podded Peas. See *Pea*.

**SUGAR PINE.** See *Pinus Lambertiana*.

**SUKANA.** A synonym of *Celosia*.

**SULCATE.** Furrowed or grooved.

**SULPHUR.** An element constantly present in protoplasm, though only in a very small amount. It is believed to be essential to living beings, and is supposed to be taken by plants from the soil, in Sulphate of Calcium, absorbed in solution by the roots. The sulphate is probably broken up on contact with the oxalates that are formed during growth, and the Sulphur is built up into organic compounds of the protoplasm group. The use of Sulphur to plants is, however, uncertain.

*Sulphur as a Remedy.* Sulphur is a very useful remedy against the attacks of the Mildew Fungi (see *Mildew* and *Oidium*) that live on the surface of the green parts of plants. It is used in the form of "Flowers of Sulphur," dusted upon both surfaces of the leaves, and of young shoots, by means of a **Sulphurator** (which see). The operation should be performed while the plants are still wet with dew. In this way, Sulphur is applied to Roses, Hops, Vines, &c., usually twice or thrice in a season; but it must be done at such periods as will permit of the Sulphur being all washed off any part that is afterwards to be made use of in food (e.g., Grapes or Hop catkins), before they are gathered. The Sulphur destroys the mycelium of such external Fungi. Weak solutions of Potassium Sulphide have been found to act equally as well as the powder, and are now coming into general use. Dusting with Flowers of Sulphur is a remedy also sometimes employed against larvæ of Sawflies, and of Moths; and both the powder and solutions of Potassium Sulphide are used to destroy

**Sulphur**—continued.

Green Fly and Red Spider. For the latter, the modes of treatment recommended are to syringe the plants, and then to scrub as vigorously as may be permitted, or to dip the shoots into the solution, which is prepared by carefully mixing 4oz. of Sulphide of Calcium with 2oz. of soft soap, and then adding hot water up to one gallon in all. This solution should be made use of twice or thrice, and will be found a most useful application; or fluids containing Sulphur, e.g., Gishurst Compound and Veitch's Chelsea Blight Composition, may be employed with success.

**SULPHURATOR.** An apparatus or appliance for distributing Flowers of Sulphur over plants attacked by Mildew, &c. It consists of a small bellows with a small tin box above the tube, having holes in the bottom. The sulphur is placed in this box, and as it shakes through into the tube it is expelled, wherever desired, by the action of the bellows.

**SULPHURIC ACID, or OIL OF VITRIOL.** In horticulture, this substance is of little use; for, though weak solutions (one part in fifty of water) have been used for syringing plants to destroy insect pests, it can be employed with safety only for hardy subjects; and there are various solutions preferable for use in this way. Sulphuric Acid is largely used in the preparation of soluble phosphates for manure. The sulphates, or compounds of Sulphuric Acid, are of considerable value. Solutions of Sulphate of Copper (Blue Vitriol) and of Sulphate of Soda are employed as washes for seeds of Oats, Barley, and other Cereals, to cleanse them from spores of the Smut Fungus (*Ustilago segetum*), and also against Bunt (*Tilletia caries*) in Wheat and in Barley. In like manner, Sulphate of Copper solution (one ounce to a gallon of water) is a valuable insecticide when syringed on plants.

Sulphates are often used as manures. Sulphate of Ammonia, prepared from gas-liquor, by the addition of Sulphuric Acid to it, or to the Ammonia that is removed from the liquor when steam is forced through it, has been found to add largely to crops when given as manure. It supplies Nitrogen in a form readily taken up by plants; but the amount should not exceed 1cwt. per acre. In the South of England, Sulphate of Lime, or Gypsum, is frequently used, in quantities of from 2cwt. to 10cwt. per acre, for Beans, Peas, and other leguminous plants, for which it is especially valuable, and with which it gives excellent results. In Germany, it is used for pastures, and also, to a less amount, for other produce. It is mostly burned and reduced to powder before being applied.

**SUMACH.** See *Rhus*.

**SUMACH, MYRTLE-LEAVED.** A common name for *Coriaria myrtifolia*.

**SUMMER BEDDING.** Most people are acquainted with this term, which applies to the planting of flower beds annually for a display through the summer and early autumn. It is usually carried out at the latter part of May and through June, the seasons varying a little according to locality. In Summer Bedding, Pelargoniums play the most conspicuous part; *Alternantheras*, *Calceolarias*, *Coleus*, *Heliotropes*, *Iresines*, *Lobelias*, *Pyrethrum* (Golden Feather), *Verbenas*, &c., are also largely employed. See also *Bedding-out*.

**SUMMER SNOWFLAKE.** See *Leucoium æstivum*.

**SUN-BURNING.** A term applied to injuries of various parts of plants, attributed, with more or less reason, to exposure to the rays of the sun in confined spaces, or where the heat is concentrated through glass or water, or by reflection from walls or other objects. Probably, both heat-rays and light-rays are concerned in

**Sun-burning**—*continued.*

the result; but it is impossible to determine the share due to each. A very rapid rise of temperature, after severe cold, is also apt to produce results included under the general name of Sun-burning.

Most plants, if exposed for some time to a temperature between 105deg. and 125deg. Fahr., are killed; but certain fleshy subjects, particularly species from tropical deserts, are able to resist even a higher temperature than 125deg. When plants that have been in a greenhouse all the winter are first put out of doors, in spring, the leaves often become brown and look scorched. These organs may die and wither, or may only become red or brown, and afterwards reassume their natural green colour. Plants do not usually suffer serious injury from this cause, though often checked in their growth for a time.

In ill-ventilated glasshouses, it often occurs that the leaves of many of the plants show round, pale, withered spots. Observation teaches that these follow the presence on the leaves, during sunshine, of drops of water; and it has been suggested that the drops act like miniature burning-glasses, focussing the rays upon the spots below them, and destroying the protoplasm by the excess of light and heat so caused. Inequalities in the glass of greenhouses are believed to give rise to similar injuries. Whatever may be the cause, experience has proved that thorough ventilation is the best preventive, and that, if this is attended to, the evil will be much diminished, if not wholly cured.

*Sun-burning* and *Sunstroke* are terms applied to injuries of the stems of trees, consisting sometimes in the bark dying, and separating from considerable surfaces, or in long strips, on the side most exposed to the sun's rays. Sunstroke is apt to occur in trees exposed by the removal of others or of undergrowth, or it may follow the erection of walls or other reflectors of heat in the immediate neighbourhood of the stems. It injures both fruit-trees (especially Peaches) and forest-trees when suddenly exposed. The cause of injury is the death of the newly-formed cells of the cambium layer by exposure to excessive heat. In trees suddenly exposed to variations in temperature greater than they had previously to bear, the bark is not sufficiently developed to protect the cambium from injury, and the result is as just described.

*Splitting of the bark* is apt to occur in spring, when trees have been exposed for some time to keen frost, followed by a sudden rise of temperature. The injury is due to unequal expansion of the bark and the wood. Probably, it is more often caused by the preceding frost than by the warmth, the thaw only bringing to view the harm already done. But that Splitting is, to some extent, connected with the sun's warmth is shown by its greater frequency on the side of the trunk that receives most of the sun's rays. Both Sun-burning and Splitting are far commoner on the Continent than in Britain, where the extremes of heat and cold are seldom such as to give rise to either. The best preventive of both is to protect the trunks and branches that may be in danger, by some simple means of shelter, such as wrapping them in straw, or coiling a straw-rope around them.

A few years ago, Dr. H. Müller, of Thurgau, called attention to the loss of grapes that occurs in various places in Germany when cold, damp weather is suddenly followed by bright, warm, sunny days. In the unripe clusters that are exposed to the direct rays of the sun, many of the grapes become pale, and then shrivel and turn brown. Sometimes, the stalks of the clusters turn brown before the grapes show signs of injury, but the latter soon shrivel and die when the stalks are killed. Experiments show that the cause of injury is excessive heat, and that similar results follow

**Sun-burning**—*continued.*

when clusters are exposed to artificial heat as great as that to which they are subjected under natural conditions, i.e., between 105deg. and 115deg. Fahr. The risk of injury is greater in proportion as the fruit is more juicy. The moister the atmosphere, the less must be the evaporation from the fruit; hence, in moist weather, evaporation cannot act as a means of keeping down the temperature, and this probably explains how the harm done is greater after a continuance of wet weather, as the air is then nearly saturated with moisture. The risk is much less in England than in Germany, as the temperature is seldom so high in our islands as to do injury. Prevention may be secured by any method of shading the clusters. The best protection is that afforded by the leaves of the Vines themselves; hence, the removal of the leaves to hasten ripening is seldom to be recommended.

Though not strictly included under Sun-burning, a few remarks may be added on the harm done by dry, windy weather to many plants that grow in moist soil. If exposed for some days to dry, warm winds, the leaves of such plants wither and die, becoming so brittle as to crumble into dust when rubbed in the hand. Under similar conditions, the same species of plants growing in drier ground may scarcely be injured. The cause is as follows: The damper the localities in which plants grow, the more are all their green parts adapted for rapid evaporation. While the evaporation is balanced by the amount of water absorbed by the roots, and carried up by the stems, growth goes on rapidly, and the plants grow luxuriantly, unless the mineral matters absorbed with the water accumulate to a hurtful degree, when the plant will become weak and sickly. But in dry, warm weather, the loss by evaporation exceeds the amount that can be supplied to the leaves; hence, they wither, and dry up. Those that suffer most are the mature leaves in the active discharge of their functions, the older and younger ones being far less severely injured. The only remedial means applicable is to shelter the choicer plants from wind and sunshine as much as possible, and to syringe their leaves occasionally. Watering the soil is of no use, as it is already too moist. On such ground, drainage is the most efficient means of preventing injury to the plants from drought.

**SUNDEW.** See *Drosera*.

**SUNDROPS.** A name applied to *Eriogonum fruticosum*.

**SUNFLOWER.** A popular name for the species and varieties of *Helianthus*, but more particularly applied to the varieties of *H. annuus*, which may readily be raised from seed each year. Sunflowers are best adapted for planting at the back of large shrubby borders or in wild gardens.

**SUNIPA** (said to be the native name in Nepal). *ORD. Orchidæ.* A monotypic genus. The species—a stove, epiphytal orchid, with small, racemose flowers, lateral, elongated, leafless scapes, and a coriaceous, slender, many-veined leaf—is a native of Java, and awaits introduction to this country.

**SUN-PLANT.** A popular name for *Portulaca grandiflora* and other species.

**SUN ROSE.** See *Helianthemum*.

**SUPERIOR.** Growing above anything. The posterior or upper lip of a corolla is the Superior. "A calyx is Half-superior when it appears to grow from above the base of an ovary, and absolutely Superior when it appears to grow from the top of the ovary. On the contrary, the ovary is Superior when it grows above the origin of the calyx" (Lindley).

**SUPERPOSED.** Stationed vertically above some other part.

**SUPERVOLUTE.** When one edge is rolled inwards, and is enveloped by the opposite edge also rolled inwards: e.g., the leaves of an Apricot-tree.

**SUPINE.** Lying flat, with face upwards.

**SUPPRESSION.** Complete abortion.

**SUPRA.** A term which, used in Latin compounds, signifies above; e.g., Supra-axillary, growing above an axil; Supra-foliaceous, growing above a leaf.

**SUPRA-DECOMPOUND.** Many times compound: e.g., the leaves of Carrot, Fennel, &c.

**SURCULOSE.** Producing suckers.

**SURCULUS.** A sucker; a shoot rising from underground.

**SURFACE CATERpillars, or SURFACE GRUBS.** The larvæ of several species of Moths, chiefly *Triphena pronuba*, *Agrotis segetum*, and *A. exclamationis*. The name is given to these larvæ because of their habit of living just below the surface of the soil during the day, coming out to feed at night on low plants and herbs. They are much in the habit of gnawing through the stems of herbaceous plants below the soil, just where the stems join the roots, and thus cause the plants to wither without any evident reason. In winter, they also frequently eat their way into fleshy tubers (potatoes) and tuberous roots (turnips, &c.), Asters, many weeds, &c., and do considerable damage. In spring, the larvæ become pupæ in earthen cocoons; and in summer, the moths emerge. Plants suffer most from the larvæ in ungenial summers, when growth is slow; and the damage then done permanently injures them. Rains occasionally enable plants to recover, even when they have suffered severely. Further information about these larvæ will be found under *Noctua*; and the best remedies are mentioned under that heading.

**SUSARIUM.** A synonym of *Symphostemon* (which see).

**SUTHERLANDIA** (named in honour of James Sutherland, Superintendent of the Royal Botanic Garden at Edinburgh; he published, in 1683, "Hortus Medicus Edinburgensis"). ORD. *Leguminosæ*. A monotypic genus. The species is a canescent, half-hardy shrub, very handsome when in flower. It succeeds best in a compost of loam and peat; and may be readily increased by seeds, or by young cuttings.

**S. frutescens** (shrubby).\* Bladder Senna of the Cape. *fl.* scarlet or bright red, handsome, in axillary racemes; calyx five-toothed; standard oblong, shorter than the boat-shaped keel; wings very short. June. *fr.* a curious, papery, inflated, many-seeded pod. *l.* impari-pinnate; leaflets numerous, elliptic or oblong, entire, exstipellate; stipules small, narrow. *h.* about 3ft. South Africa, 1663. (B. M. 181, under name of *Coleutea frutescens*.)

**S. f. microphylla** (small-leaved). *fl.* two or three to a peduncle. *l.* leaflets oblong-linear, glabrous above, pubescent beneath. 1816.

**SUTRINA** (said to be the native name in Peru). ORD. *Orchideæ*. A monotypic genus. The species—a dwarf, stovch, epiphytal orchid, with scattered-racemose, medium-sized flowers, an erect, simple scape, coriaceous leaves, and a very short, one or two-sheathed stem—is a native of Pern, and is unknown to cultivation.

**SUTTONIA** (named in honour of the Rev. Dr. Sutton, 1756-1846, an English botanist). ORD. *Myrsinæ*. A small genus of greenhouse, evergreen shrubs or small trees, natives of New Zealand and the Sandwich Islands. *Suttonia* is now included, by Bentham and Hooker, under *Myrsine*; it only differs in having its petals free as far as the base, and its stigma sub-sessile. The only

*Suttonia*—continued.

species calling for mention here is *S. australis*. For culture, see *Ardisia*.

**S. australis** (Southern). *fl.* minute, in capitate, lateral fascicles. *l.* lin. to 1½ in. long, oblong or obovate, obtuse, coriaceous, undulate, much-veined, studded with rounded, pellucid glands. *h.* 8ft. to 10ft. New Zealand. A perfectly glabrous shrub, with its bark nearly black. Its proper name, according to Hooker, is *Myrsine Urvilæi*.

**SUTURE.** The line of junction of two different parts. Sutural dehiscence is the act of splitting along the line of junction of two valves.

**SWAINSONA** (named in honour of Isaac Swainson, F.R.S., a celebrated cultivator of plants, about the end of the last century, at Twickenham). Including *Cyclogyne*. ORD. *Leguminosæ*. A genus comprising about twenty-three species of very elegant, greenhouse herbs or sub-shrubs; one is a native of New Zealand, and the rest are Australian. Flowers bluish-violet, purple, red, rarely white or yellow, disposed in axillary, often pedunculate racemes; calyx teeth sub-equal, or the two upper ones shorter; standard orbicular or reniform, spreading or reflexed; wings oblong, falcate or slightly twisted, often shorter than the broad, incurved keel; bracts membranous, usually narrow or small. Pods ovoid or ohlong, turgid or inflated. Leaves impari-pinnate; leaflets numerous, entire, exstipellate; stipules usually herbaceous, rarely bristly. The species best known to cultivators are described below. They are all Australian, and well deserve a place in every greenhouse, thriving in a mixture of sandy loam and peat. Propagation may be readily effected by young cuttings, inserted in sand, under a glass; or by seeds.

**S. atrococcinea** (dark scarlet). Probably a garden name for a form of *S. galegifolia*.

**S. canescens** (hoary). *fl.* blue or violet-purple, variegated with pink, and with a green blotch at the base of the standard, nearly sessile; calyx silky-hairy; keel much curved; racemes many-flowered, on long, silky-villous peduncles. May. *l.* leaflets nine to fifteen, obovate or oblong-elliptic, obtuse or retuse, ½ in. to 1 in. long, nearly glabrous above, softly pubescent beneath. Stock woody, with erect, but herbaceous, stems, 1ft. to 2ft. high. (P. M. B. vii. 199, under name of *Cyclogyne canescens*.)

**S. coronillæfolia** (Coronilla-leaved). A form of *S. galegifolia*.

**S. galegifolia** (Galega-leaved).\* *fl.* deep red, rather large; standard having prominent callosities above the claw; racemes pedunculate, exceeding the leaves, and sometimes twice as long. July. *l.* leaflets eleven to twenty-one, or rarely more, oblong, obtuse or emarginate, mostly ½ in. to ¾ in. long. 1800. A glabrous perennial or sub-shrub, with erect, flexuous branches, 1ft. high, or sometimes climbing to several feet. (L. J. P. 304, under name of *S. Osbornii*; A. B. R. 319, under name of *Vicia galegifolia*; B. M. 792, under name of *Coleutea galegifolia*.) *S. albiflora* (B. R. 994; L. B. C. 1642) is a form with white flowers, and *S. coronillæfolia* (B. M. 1725) has light purplish-pink flowers. The plants in gardens under names of *S. atrococcinea*, *S. magnifica*, and *S. purpurea* are probably forms of this species.

**S. Greyana** (Grey's).\* Darling River or Poison Pea. *fl.* pink, large, in long, erect, pedunculate racemes; calyx densely cottony-white, longer than the pedicels; standard ½ in. in diameter. July. *l.* leaflets eleven to twenty-one, oblong, obtuse or retuse, ½ in. to 1 in., or sometimes 1½ in., long. Stems erect or ascending, 2ft. to 3ft. high. 1844. Perennial herb or sub-shrub. (B. M. 4416; B. R. 1846, 66.)

**S. lessertiiifolia** (Lessertia-leaved). *fl.* violet-purple, rather small, in short racemes, sometimes reduced to umbels or heads, on peduncles longer than the leaves; standard without callosities. July. *l.* leaflets nine to fifteen, or rarely more, oblong, obtuse, mucronate, or almost acute, ½ in. to 1 in. long. Stems diffuse or ascending, 1ft. to 1½ ft. high. 1824. Perennial herb.

**S. magnifica** (magnificent), of gardens. Probably a form of *S. galegifolia*.

**S. occidentalis** (Western). *fl.* purple, numerous, in long, pedunculate racemes; calyx sparsely hairy; standard ½ in. broad, but not so long. Summer. *l.* leaflets eleven to seventeen, or occasionally more, oblong, obtuse, or acute, ½ in. to nearly 1 in. long. Stems usually erect, and bent in zigzag form at the nodes. *h.* 2ft. to 3ft. A glabrous or pubescent perennial. (B. M. 5490.)

**S. procumbens** (procumbent). *fl.* violet or blue, large and fragrant, disposed in a loose raceme, on a peduncle often attaining 1ft.; standard about 1 in. long, deeply emarginate, without callosities; keel much incurved. Summer. *l.* leaflets eleven to

**Swainsona**—*continued*.

twenty-one or more, varying from oblong or almost linear, and  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long, to lanceolate or linear, acute, and upwards of 1 in. long. Stems procumbent, ascending, or erect. 1862. Perennial herb. SYN. *S. violacea*.

**S. purpurea** (purple), of gardens. Probably a form of *S. galegifolia*.

**S. violacea** (violet). A synonym of *S. procumbens*.

**SWALLOW-WORT.** See *Asclepias* and *Chelidonium*.

**SWAMMERDAMIA.** Now included under *Heli-chrysum*.

**SWAMP DOGWOOD.** A common name for *Ptelea trifoliata* (which see).

**SWAMP HICKORY.** A popular name for *Carya amara* (which see).

**SWAMP ROSE-MALLOW.** A common name for *Hibiscus Moscheutos*.

**SWAMP SAXIFRAGE.** See *Saxifraga pennsylvanica*.

**SWAMP WHITE OAK.** See *Quercus bicolor*.

**SWAN-NECK, or SWANWORT.** See *Cyc-noches*.

**SWAN-RIVER DAISY.** A common name for *Brachycome* (which see).

**SWARTZIA** (named in honour of Olaf Swartz, M.D., of Stockholm, 1760-1818, a long time resident in the West Indies, author of "Flora Indis Occidentalis"). ORD. *Leguminosæ*. A genus comprising nearly sixty species of unarmed, stove trees; one is a native of tropical Africa, and the rest inhabit tropical America. Flowers racemose, or one to a peduncle; calyx firmly closed, but ultimately splitting; corolla sometimes wanting, when present consisting of only one petal (standard), or rarely two or three; stamens indefinite. Pods ovoid or elongated, turgid or sub-terete. Leaves imparipinnate or one-foliolate. Only two species call for description here. They should be grown in a mixture of sandy loam and peat. Cuttings, with the leaves intact, will root in sand, under a glass, in heat.

**S. grandiflora** (large-flowered). *f.* yellow, three to five in a corymb, the one petal 1 in. or more in diameter. June. *l.*, leaflet single,  $\frac{3}{4}$  in. to  $\frac{5}{8}$  in. long, elliptic-oblong, with a bluntish point, glabrous, undulated; petioles short. *h.* 6 ft. West Indies, 1821. SYN. *S. simplicifolia*.

**S. pinnata** (pinnate-leaved). *f.* yellowish, the one petal roundish, glabrous, half as long again as the calyx; pedicels fasciated; racemes elongated, tomentose-pubescent, longer than the calyx. June. *l.*, leaflets five,  $\frac{5}{8}$  in. to  $\frac{1}{2}$  in. long, elliptic-oblong, pointed, glabrous. *h.* 6 ft. West Indies, 1817.

**S. simplicifolia** (simple-leaved). A synonym of *S. grandiflora*.

**SWEDISH JUNIPER.** See *Juniperus communis fastigiata*.

**SWEET ACORN OAK.** See *Quercus Ballota*.

**SWEET ALYSSUM.** See *Koeniga maritima*.

**SWEET AMBER.** See *Hypericum Androsæmum*.

**SWEET BASIL.** See *Basil, Sweet*.

**SWEET BAY-TREE.** See *Laurus nobilis*.

**SWEETBRIAR.** See *Rosa rubiginosa*.

**SWEET BROOM.** See *Scoparia dulcis*.

**SWEET CALABASH.** See *Passiflora maliformis*.

**SWEET CASSAVA.** See *Manihot Aipi*.

**SWEET CHESTNUT.** See *Castanea sativa*.

**SWEET CICELY** (*Myrrhis odorata*). A hardy perennial, native of Southern Europe, sparingly cultivated for the use of its leaves in salads, &c. It grows almost anywhere, and may be increased by seeds, sown in autumn, or by divisions. The leaves have a strong flavour of aniseed.

**SWEET FLAG OR SEDGE.** See *Acorus Calamus*.

**SWEET GALE, or SWEET WILLOW.** See *Myrica Gale*.

**SWEET GUM.** See *Liquidambar styraciflua*.

**SWEET LIME.** See *Citrus Limetta*.

**SWEET ORANGE.** See *Citrus Aurantium*.

**SWEET POTATO.** See *Batatas edulis*.

**SWEET SCABIOUS.** See *Scabiosa atropurpurea*.

**SWEET-SCENTED CRAB.** See *Pyrus coronaria*.

**SWEET-SCENTED VERBENA.** See *Lippia citriodora*.

**SWEET SOP.** The fruit of *Anona squamosa* (which see).

**SWEET SULTAN.** A common name for several species of *Centaurea*.

**SWEET WILLIAM.** See *Dianthus barbatus*.

**SWERTIA** (named after Iman. Swert, a famous cultivator of bulbs, &c., in Holland, author of "Florilegium," 1612). Felwort. SYNS. *Agathotes*, *Henricea*, *Monobothrium*, *Ophelia*. ORD. *Gentianæ*. A genus comprising about forty species of greenhouse or hardy, erect, annual or perennial herbs, inhabiting Europe, Asia, and Africa, mostly in mountainous regions. Flowers blue, rarely yellow, clustered, cymose, or loosely pedicellate, disposed in racemiform, thyrsoid, or loosely corymbose panicles; calyx four or five-parted; corolla rotate, with a very short tube, the lobes twisted to the right; stamens four or five, affixed at the base of the corolla. Leaves opposite, or in the perennial species radical, on long petioles; cauline ones occasionally alternate. The species described below are—with the exception of *S. perennis*—all Indian annuals. Seeds should be sown on a hotbed, and the seedlings, when frosts are well over, transplanted where they are intended to remain. *S. perennis* was once reported as having been found growing wild in Wales, but this has never been confirmed.

**S. alata** (winged). *f.* lurid green-yellow, veined with purple, four-parted, in large panicles; corolla lobes often shorter than the calyx. Summer. *l.*, cauline ones sub-sessile, ovate, acute. Stem four-angled, often four-winged. *h.* 1 ft. to 2 ft. 1868. (B. M. 5687, fig. 12, under name of *Ophelia alata*.)

**S. angustifolia** (narrow-leaved). *f.* usually white, dotted with blue or black; sepals often longer than the corolla. Summer. *l.* narrow-lanceolate, narrowed at base. *h.* 1 ft. to 2 ft. 1868. (B. M. 5687, figs. 3, 4, under name of *Ophelia angustifolia*.)

**S. corymbosa** (corymbose).\* *f.* pale blue, or white with blue nerves; cymes forming a level-topped corymb. May. *l.*, lower cauline ones  $\frac{3}{4}$  in. long, spatulate-obovate, obtuse, slightly petioled; upper ones sessile, ovate or oblong,  $\frac{1}{2}$  in. long, sub-acute. Stem  $\frac{3}{4}$  in. to 20 in. high, quadrangular or four-winged. 1836. (B. M. 4489, under name of *Ophelia corymbosa*.)

**S. paniculata** (panicled).\* *f.*, sepals oblong, acute; corolla lobes white above, with two purple or lurid-green marks at base; panicle branched. Summer. *l.* oblong or lanceolate. *h.* 1 ft. 1868. (B. M. 5687, figs. 5, 6, under name of *Ophelia paniculata*.)

**S. perennis** (perennial). Marsh Felwort. *f.* erect; corolla blue, with dark spots, the segments elliptic-oblong and slightly acute. July. *l.*, lower ones oblong-elliptic, on long petioles; cauline ones opposite, ovate-oblong, somewhat obtuse. Stem ascending, many-flowered. *h.* 9 in. Europe. Hardy perennial, requiring a moist, half-boggy position. (P. D. 2047; R. G. 1885, 274.)



**Swertia**—continued.

**S. purpurascens** (purplish). *fl.* purple or dark red; sepals oblong; corolla lobes  $\frac{1}{2}$  in. long, ovate, much reflexed; panicles divaricate, many-flowered, leafy. June. *l.* oblong or lanceolate,  $\frac{1}{2}$  in. long, narrowed at base; the lowest ones nearly obtuse, the uppermost ones acute, glabrous. Stems 8 in. to 3 ft. high. 1840.

**S. trichotoma** (trichotomous). *fl.* white; corolla lobes often caudate; pedicels  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, numerous, umbelled or clustered at the ends of the cyme branches. Summer. *l.*, upper canline ones elliptic-lanceolate. *h.* 1 ft. to 1 $\frac{1}{2}$  ft. 1853. This is closely allied to *S. corymbosa*. (B. M. 5397, under name of *Ophelia umbellata*.)

**SWIETENIA** (named in honour of Gerard von Swieten, 1700-1772, a Dutch botanist and author). ORD. *Meliaceæ*. A monotypic genus. The species is a tall, stove tree, with fuscous-red wood—well known as Mahogany, and extensively employed in the manufacture of furniture, &c. *S. Mahagoni* thrives in a compost of loam and sand. It may be increased by ripened cuttings, with the leaves intact, inserted in sand, under a hand-glass, in heat.

**S. Mahagoni**. Mahogany-tree. *fl.* reddish-yellow, small, in axillary and sub-terminal panicles; calyx five-cleft; petals five, imbricated. May. *l.* abruptly pinnate, highly glabrous; leaflets opposite, petiolulate, oblique, ovate, long-acuminate. *h.* 70 ft. Central America and the Antilles, 1734.

**SWIFT MOTHS**. See **Otter Moth**.

**SWISS STONE PINE**. See **Pinus Cembra**.

**SWORD LILY**. A common name for *Gladiolus*.

**SYAGRUS** (the old Greek name of a Palm, mentioned by Pliny). ORD. *Palmæ*. A small genus of stove, unarmed Palms, now included, by Bentham and Hooker, under *Cocos*. Flower-spike enveloped in a double spathe. Shell of the fruit hard and bony, having a broad, smooth band or channel running from each of the three pores, and meeting at the top; seed oily, sometimes hollow, inclosed in a hard, bony shell, surrounded by a fibrous rind. Leaves terminal, pinnatisect. For culture, see **Cocos**.

**S. amara** (bitter). *fl.*, inner leaflets of the males linear-oblong; females ovate-globose, *fr.* ovoid-oblong, blunt at both ends,  $\frac{3}{4}$  in. long, *l.* segments linear, acuminate. Trunk 50 ft. to 100 ft. or more in height. Jamaica. In habit this species closely resembles *Cocos nucifera*.

**S. botryophora** (cluster-bearing). *fl.*, spathe secund, as long as the spadix, sulcate; spadix  $\frac{1}{2}$  ft. or more long. *l.* erecto-patent, 9 ft. to 10 ft. long; pinnae opposite or grouped,  $\frac{1}{2}$  ft. to 2 ft. long, linear, acuminate, obliquely adnate, slightly crisped. Trunk straight, 50 ft. to 60 ft. high, 6 in. to 10 in. thick. Bahia, 1836. SYN. *Attalea grandis*.

**S. campestris** (field-loving).\* *fl.*, spathe as long as the spadix; spadix  $\frac{1}{2}$  ft. long, spreading when flowering, nodding in fruit. *l.* spreading, 2 ft. to 6 ft. or more long; pinnae  $\frac{1}{2}$  ft. to 2 ft. long, not more than  $\frac{1}{2}$  in. broad; petioles broadly sheathing and very thick, clothed at the edges with woody, brown fibres, and armed with a few stout, dark reddish-brown spines on the naked portion. Trunk swollen at base. Brazil. An elegant and highly ornamental plant.

**S. coocoides** (Cocos-like).\* *fl.* yellowish-white, rather large; outer spathe 1 ft. long, obtuse, navicular, ferruginous-tomentose outside, within at first yellowish-white, at length fuscous; inner spathe, together with the compressed-terete peduncle,  $\frac{1}{2}$  ft. long; spadix slightly and simply branched, drooping,  $\frac{1}{2}$  ft. long, nodding or pendulous, and 2 ft. long when fruiting. *l.* all terminal, rather loose, erecto-patent, arcuate, tufted,  $\frac{1}{2}$  ft. to 6 ft. long, pinnate; pinnae linear, narrow, slightly curled, the adults 5 in. to 12 in. long, linear-lanceolate, acuminate, highly glabrous. Trunk 8 ft. to 10 ft. high, 2 in. to 3 in. thick. Brazil, 1823.

**S. comosa** (tufted). *fl.*, spathe fusiform, sulcate; spadix 1 ft. or more long, with five, six, or numerous flexuous branches. *fr.* fibry, oblong or ovate-oblong, glabrous. *l.* 3 ft. to 4 ft. long, spreading; pinnae erect, approximate, lanceolate, obliquely adnate. Trunk 10 ft. or rarely more in height, annulate below. Brazil.

**S. Mikaniana** (Mikan's). *fl.*, spadix 2 ft. to 3 ft. long. *fr.* about 2 in. long. *l.* dense, slightly crisped, 8 ft. to 10 ft. long; pinnae linear-lanceolate, acuminate. Trunk 40 ft. to 50 ft. high, nearly 1 ft. thick, irregularly annulate. Brazil, 1853.

**S. Sanoona** (Sancona). *fl.*, outer spathe smaller; inner one fusiform, 3 ft. long, opening at back; spadix simply branched; in-

**Syagrus**—continued.

florescence monœcious, axillary. *fr.* orange, ovoid, glabrous, smooth. *l.* 8 ft. long, reticulate and sheathing at base, spreading; leaflets about 180 on each side, aggregate in threes, fours, or fives, linear, acute, glabrous, papyraceous, 2 ft. long, 2 in. broad. Trunk 60 ft. to 80 ft. high, 6 in. thick. Brazil.

**SYCAMINE-TREE**. A Scriptural name for the Mulberry-tree. See **Morus**.

**SYCAMORE-TREE**. See **Acer Pseudo-platanus**. The name is also applied to *Platanus occidentalis* and other species.

**SYCHINIUM**. A synonym of *Dorstenia*.

**SYCOMORE FIG-TREE**. See **Sycomorus antiquorum** (the proper name of which is now *Ficus Sycomorus*).

**SYCOMORUS** (the old Greek name used by Dioscorides; from *sycos*, a fig, and *moros*, a mulberry). ORD. *Urticaceæ*. A genus comprising nearly a score species of stove or greenhouse trees, confined to the Old World, now included, by the authors of the "Genera Plantarum," under *Ficus*. Male flowers sessile, the perianth three or rarely two-parted; females sessile or pedicellate, the perianth three or many-parted. Leaves alternate, rounded-cordate or oblong, entire or serrated, glabrous, puberulous, or rough. Only a couple of species call for description here. They thrive in sandy loam, with the addition of a little leaf soil, and only small pots, in comparison to the size of plant, need be used. Plenty of syringing, or occasional sponging, will keep the leaves clean, and almost any amount of water may be applied to the roots. The plants are readily propagated by cuttings or eyes, having a leaf attached, inserted in a close frame, inside a propagating house, in early spring.

**S. antiquorum** (ancients). Pharaoh's Fig; Sycomore Fig-tree. *fl.* greenish or yellowish, racemose, pedunculate. *l.* ovate, obtuse, cordate at base, four or five-ribbed on both sides, entire, repand, or slightly angular, at length nearly glabrous and smooth; petioles and branchlets slightly hairy. Egypt. SYN. *Ficus Sycomorus*.

**S. capensis** (Cape). *l.* ovate or ovate-oblong, attenuated and slightly obtuse at apex, rounded or sub-emarginate and entire at base, the rest deeply dentate-serrate, glabrous, smooth, three or four times as long as the petioles. Cape of Good Hope, 1816.

**SYKESIA**. A synonym of *Gartnera* (which see).

**SYLVESTRIS**. Growing in woods.

**SYMEA**. A synonym of *Solaria* (which see).

**SYMMETRICAL**. Regular as to the number of parts or as to shape: e.g., a flower with five sepals, five petals, and five, ten, or fifteen stamens.

**SYMPETALOUS**. The same as **Monopetalous** (which see).

**SYMPHACHNE**. A synonym of *Eriocaulon* (which see).

**SYMPHORIA**. A synonym of *Symphoricarpus* (which see).

**SYMPHORICARPUS** (from *symphoreos*, to bear together, and *karpos*, fruit; in allusion to the clusters of berries). St. Peter's Wort; Snowberry-tree. SYN. *Symphoria*. ORD. *Caprifoliaceæ*. A genus comprising about half-a-dozen species of handsome, dwarf, hardy, deciduous shrubs, natives of North America and the mountains of Mexico. Flowers white or pink, small, disposed in short, axillary racemes or spikes; calyx tube sub-globose, the limb somewhat irregularly four or five-toothed; corolla funnel-shaped or campanulate, the limb four or five-lobed; stamens four or five. Drupes white or red, baccate, ovoid or globose, fleshy, four-stoned. Leaves opposite, shortly petiolate, ovate, entire or, on young plants, sinuate-toothed. Four of the species have been introduced. They are of very simple culture in

**Symphoricarpus**—*continued*.

ordinary garden soil, and may be readily increased by suckers, which are thrown up in abundance. The flowers of *S. racemosus* are much sought after by bees; and its fruits form excellent food for game.

**S. microphyllus** (small-leaved). *fl.* white, axillary, solitary. August. *l.* roundish-ovate, slightly obtuse, pubescent. *h.* 4ft. Mexico, 1829. (B. M. 4975.) *Syn.* *S. montanus* (B. i. 20).

**Symphoricarpus**—*continued*.

July to September. *fr.* white, large, persistent through a great part of the winter. *l.* glaucous beneath. *h.* 4ft. to 6ft. North America, 1817. (B. M. 2211 and L. B. C. 230, under name of *Symphoria racemosus*.)

**S. r. pauciflorus** (few-flowered). *fl.*, spike reduced to one or two flowers in the axils of the uppermost leaves. *l.* about lin. long.

**S. vulgaris** (common). Coral Berry; Indian Currant; Common

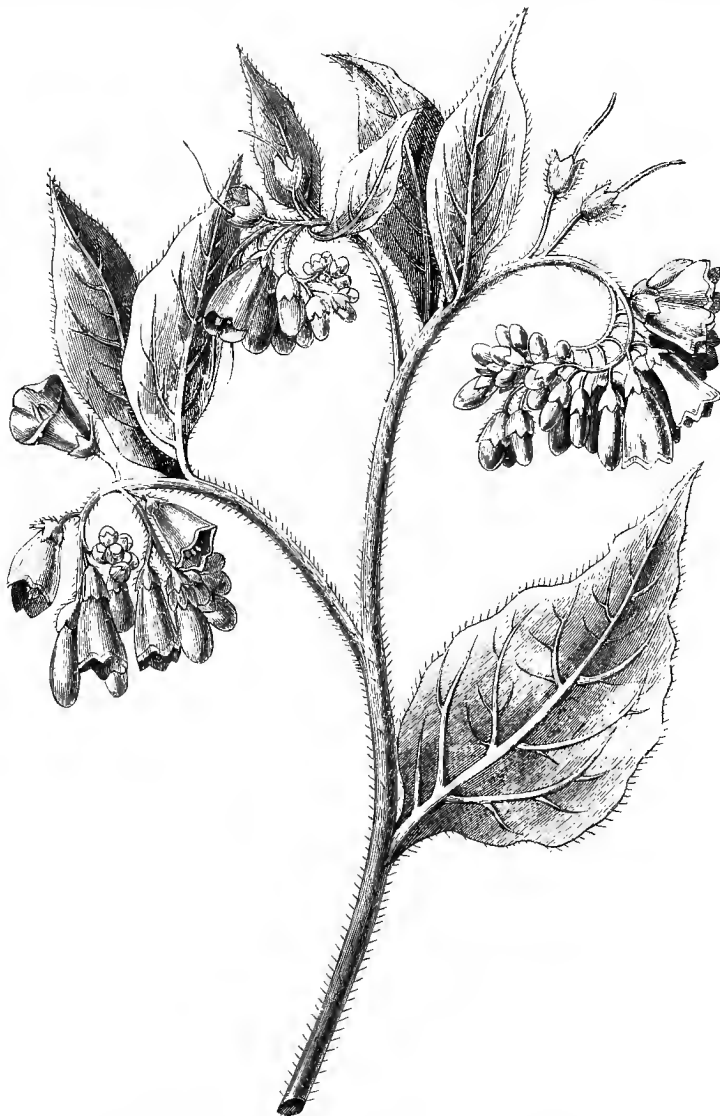


FIG. 557. UPPER PORTION OF PLANT OF SYMPHYTUM ASPERRIMUM.

**S. montanus** (mountain-loving). A synonym of *S. microphyllus*.

**S. occidentale** (Western).\* Wolf Berry. *fl.* white, tinged with rose-colour, larger and more funnel-shaped than in *S. racemosus*, in dense, terminal and axillary spikes; corolla much bearded within; stamens and style protruded. Summer. *fr.* white. *l.* oval, shortly petiolate, downy beneath, entire, or wavy-toothed or lobed on the young shoots. North America.

**S. racemosus** (racemose-flowered).\* Common Snow Berry. *fl.* rose-coloured, in loose and somewhat leafy, interrupted spikes at the ends of the branches; corolla bearded inside.

St. John's Wort. *fl.* red and yellow, small, in small, close clusters in the axils of all the leaves; corolla sparingly bearded. July to September. *fr.* dark red, the size of hemp-seed. *l.* elliptic-ovate, obtuse, glaucous, pubescent beneath. *h.* 3ft. to 6ft. North America, 1730. In the form *foliis variegatis* the leaves are finely variegated with green and yellow.

**SYMPHYANDRA** (from *symphio*, to grow together, and *aner*, *andros*, an anther; the anthers are connate). **ORD. Campanulaceæ.** A genus comprising seven species

**Symphyandra**—continued.

of hardy, perennial herbs, natives of the Orient, distinguished from *Campanula* in having connate anthers. Flowers white, yellow (or blue), often nodding, rather large, racemose or loosely paniculate, five-parted; inflorescence centrifugal. Leaves broad, often cordate, toothed; radical ones on long petioles; cauline ones alternate, few or small. Three species have been introduced. A rather rich sandy loam, with plenty of drainage, suits these plants. They are propagated by division of the roots, or by young cuttings, in spring; also by seeds.

**S. Armena** (Armena). *fl.* blue, terminal, solitary, erect; calyx hoary, with triangular segments; corolla tubular, velvety. June. *l.* ovate, acute, deeply serrated, velvety-hoary. *h.* 2ft. 1836.

**S. pendula** (pendulous). *fl.* cream-colour, paniculate; calyx lobes lanceolate; corolla funnel-shaped, velvety. July. *l.* ovate, acute, crenate-toothed, velvety. Stem branched, pendulous, somewhat woody, pilose. *h.* 2ft. 1823. (S. B. F. G. ser. ii. 66.)

**S. Wanneri** (Wanner's)\* *fl.* blue; calyx lobes acuminate, one-half shorter than the tubular-campanulate corolla; peduncles one-flowered, axillary and terminal. Summer. *l.* lanceolate, unequally toothed, villous-pubescent, the lower ones petiolate. Stems erect, 6in. high, terete, striated, pubescent. Alps. SYN. *Campanula Wanneri*.

**SYMPHYOGLOSSUM.** A synonym of **Cyananthum** (which see).

**SYMPHYOSTEMON** (from *symphyo*, to unite, and *stemon*, a stamen; the filaments are connate at base, in a cylindrical tube). SYNS. *Psithyrisma*, *Susarium*. ORD. *Irideæ*. A small genus (two or three species) of greenhouse or half-hardy plants, with fibrous roots, natives of extra-tropical South America or the Andes. Flowers several in a spathe, pedicellate; perianth yellow, whitish, or purple-striped, the tube rather long, funnel-shaped, the lobes sub-equal and erect-patent; stamens affixed to the throat; scape sometimes very short, sometimes very tall and leafless, or with one floral leaf. Leaves radical, linear, clustered. *S. narcissoides*, the only species introduced, thrives in a compost of sandy loam and leaf mould. Propagation may be effected by seeds, or by offsets, in spring.

**S. narcissoides** (Narcissus-like). *fl.* dirty-white, veined with brownish-purple, very fragrant, nodding, on short stalks, funnel-shaped; spathe consisting of bracts, membranous at the margin, of which the lowermost is sharper than the others. June. *l.* very narrow, glaucous, subulate at apex. Stem 1ft. to 1½ft. high. South coasts of South America, 1828. SYN. *Sisyrinchium odoratissimum* (B. R. 1283).

**SYMPHYOSTEMONOUS.** With united stamens.

**SYMPHYSIS.** A term signifying a growing together.

**SYMPHYTUM** (the old Greek name used by Dioscorides, and derived from *symphuo*, I make to grow together; from its supposed power of healing wounds). Comfrey. ORD. *Boraginææ*. A genus comprising about seventeen species of hardy, erect, sometimes tuberous herbs, natives of Europe, North Africa, and Western Asia. Flowers yellowish, blue, or purplish, pedicellate, cymose or racemose; calyx five-cleft or five-parted, the segments linear; corolla broadly tubular, enlarged above, with five scales in the throat; lobes five, very short, erect and tooth-like or scarcely spreading; stamens five, affixed to the middle of the tube. Nutlets four, ovoid, smooth. Leaves alternate or mostly radical; cauline ones sometimes decurrent; uppermost ones sometimes closely approximate and nearly opposite. *S. officinale* is a well-known plant which has become rather widely naturalised along our water-courses; it has much the taste and properties of Borage. The species described below are showy subjects,

**Symphytum**—continued.

thriving in almost any soil or situation. They succeed under the shade of trees, and flower throughout the principal part of the summer. Propagation may be effected by divisions.

**S. asperrium** (very rough). Prickly Comfrey; Trottes. *fl.* bluish-purple; corolla campanulate, four times as long as the calyx. *l.* ovate-lanceolate, very acute at both ends, scabrid; lower ones petiolate; uppermost ones sub-sessile. Stem branched, strigosely bristly. *h.* 4ft. Caucasus, 1799. See Fig. 557. The variety *aureo-variegatum* has the leaves bordered with yellow.

**S. bohemicum** (Bohemian). A synonym of *S. officinale bohemicum*.

**S. caucasicum** (Caucasian)\* *fl.* blue; corolla sometimes thrice as long as the obtusely five-toothed calyx, the limb campanulate. *l.* ovate-lanceolate, hairy; lower ones attenuated into long petioles; upper ones nearly opposite, shortly decurrent at the sides of the stem. *h.* 3ft. Caucasus, 1820. (B. M. 3188.)

**S. Donii** (Don's). *fl.* blue; calyx lobes subulate, scabrid; corolla tube equalling the calyx, the limb campanulate, with linear, obtuse appendages. *l.* scabrid; lower ones ovate-lanceolate, attenuated into the petioles; upper ones lanceolate, narrow, decurrent at the sides of the stem. *h.* 2ft. (S. B. F. G. ser. ii. 294, under name of *S. caucasicum*.)

**S. officinale** (official). Alum; Black Root; Common Comfrey; Knitback, &c. *fl.* creamy-yellow, drooping, in scorpioid cymes; calyx lobes narrow-lanceolate; corolla 1in. long. *l.* ovate-lanceolate; radical ones 4in. to 8in. long, on long, winged petioles; cauline ones shortly petiolate. Stem 1ft. to 3ft. high, branched. Europe (Britain), &c. (Sy. En. B. 1115.)

**S. o. bohemicum** (Bohemian)\* *fl.* red or reddish-purple; racemes twin, erect, revolute at apex. *l.* running into the petioles. Bohemia, 1810. (S. B. F. G. ser. ii. 304.) SYN. *S. bohemicum*.

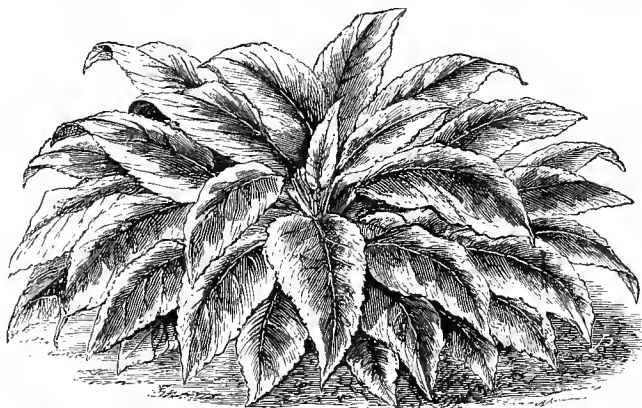


FIG. 558. SYMPHYTUM OFFICINALE LUTEO-MARGINATUM.

**S. o. luteo-marginatum** (yellow-margined). A variety having the leaves margined with yellow. 1870. See Fig. 558. SYN. *S. o. variegatum*.

**S. o. patens** (spreading). A purple-flowered form. (Sy. En. B. 1116.)

**S. o. variegatum** (variegated). A synonym of *S. o. luteo-marginatum*.

**S. orientale** (Oriental). *fl.* whitish; corolla twice as long as the five-toothed calyx, funnel-shaped above, with linear-attenuated appendages. *l.* oblong-ovate, acute, narrowed at base; lower ones alternate, petiolate, sub-cordate; uppermost ones nearly opposite, sessile. Stem branched. *h.* 3ft. Orient, 1752. Plant clustered, pubescent.

**S. o. angustior** (narrowed). *l.* oblong- or oval-lanceolate, undulated. (B. M. 1912, under name of *S. orientale*.)

**S. peregrinum** (foreign). *fl.* reddish and purplish; calyx five-parted nearly to the base, the segments acuminate; corolla three or four times longer than the calyx, sub-campanulate above the middle, shortly five-cleft. *l.* lower ones on long petioles, elliptic-lanceolate, acuminate; upper ones sessile. Stem tall, branched. Iberia, &c., 1816. See Fig. 559. (B. M. 6466.) This species is largely cultivated as a fodder plant, under the erroneous name of *S. asperrium*. By some authors it is regarded as a hybrid between *S. asperrium* and *S. officinale*.

**Symphytum**—continued.

**S. tauricum** (Taurian). *fl.* whitish; calyx acutely lobed above the middle; corolla twice as long as the calyx, with obtuse lobes and linear appendages. *l.* acute, slightly undulated; lower ones alternate, petiolate, ovate-cordate; uppermost ones opposite, sessile. Stem branched. *h.* 3ft. Tauria, 1805. Plant pilose, hairy. (B. M. 1787.)



FIG. 559. INFLORESCENCE OF SYMPHYTUM PEREGRINUM.

**S. tuberosum** (tuberous-rooted). \* *fl.* ochreous. *l.* scarcely decurrent; radical ones on long petioles. Stem 1ft. to 2ft. high. Rootstock short, horizontal. Europe (Britain). This resembles *S. officinale*, but the flowers are smaller, and the radical leaves are on longer petioles. (J. F. A. 225; Sy. En. B. 1117.)

**SYMPIEZA** (from *sympiezo*, to press; in reference to the stamens, which adhere to the corolla tube). ORD. *Ericaceæ*. A small genus (five species) of small, Heath-like, greenhouse shrubs, confined to South Africa. Flowers small, clustered in terminal heads, ebracteate or tribracteate; calyx rather thick, complanate and bilabiate or tubular-campanulate and four-toothed; corolla marcescent, oblique or curved, with a shortly-bifid limb, the lobes broad and connivent; stamens four, exserted. Leaves ternately whorled, small or minute, linear or elliptic, sulcate at back. *S. capitellata*, the only species introduced to our gardens, is a pretty little shrub, thriving in a compost of turfy peat and sand. It may be increased by young cuttings, inserted in sand, under a glass.

**S. capitellata** (small-headed). *fl.* pink. In sub-globose, drooping heads; corolla thrice as long as the shortly-ciliated, compressed, bilobed calyx. July. *l.* linear-triangular or erecto-incurred; floral ones scarcely longer than the calyx. *h.* 1½ft. 1812.

**SYMPLOCARPUS** (from *symploke*, connection, and *karpus*, fruit; alluding to the coalescence of the ovaries into a compound fruit). SYNS. *Ictodes*, *Spathyema*. ORD. *Aroidæ* (*Araceæ*). A monotypic genus. The species is a large, robust, hardy, aquatic perennial,

**Symplocarpus**—continued.

having a similar fœtid odour to that of the skunk. It succeeds in a marshy situation, preferring peat soil. Increased by divisions.

**S. foetidus** (fœtid). Meadow or Skunk Cabbage, &c. *fl.* all fertile; spaths spotted and striped with purple and yellowish-green, ventricose or conchoid, curved at apex, thickly coriaceous, persistent; spadix violet, included, globular, short-stalked, entirely covered with thickly-crowded flowers; peduncle very short. May. *l.* 1ft. to 2ft. long, ample, ovate-cordate, acute, thickly coriaceous, with thick nerves; petioles short, robust, long-veined. Rootstock descending. *h.* 1ft. America, North-eastern Asia, and Japan. (B. M. 3224.) SYN. *Pothos foetidus* (B. M. 836).

**SYMPLOCOS** (from *symploke*, a connection; the stamens are united at the base). Including *Hopea*. ORD. *Styracææ*. A large genus (about 150 species) of stove or greenhouse, usually glabrous, rarely pubescent or villous, trees and shrubs, broadly dispersed over the warmer parts of Asia, Australia, and America. Calyx five-lobed, imbricated; corolla lobes or segments five and one-seriate, or six to ten and biseriate, free or more or less connate; stamens often numerous, many-seriate; racemes or spikes axillary, loose or dense, sometimes reduced to few-flowered fascicles or even to single flowers. Leaves alternate, coriaceous or membranous. The five species introduced thrive in a compost of loam, peat, and sand. Propagation may be effected by cuttings, inserted in sand, under a glass (those of *S. coccinea* and *S. Sumuntia* in heat).

**S. coccinea** (scarlet). *fl.* red, axillary, solitary, sessile, lin. broad; corolla ten-lobed, spreading; petals nearly connate at base. May. *l.* elliptic-oblong, 3in. to 4in. long, acuminate, obtuse at base, crenulated, glabrous above, pilose beneath; petioles ½in. long. *h.* 10ft. Mexico, 1825. Stove tree.

**S. cratægoides** (Cratægus-like). *fl.* white, small; panicles lin. to 5in. long, cymosely many-flowered. April. *l.* 2½in. by lin. to 1½in., varying from lanceolate and acuminate to broadly obovate-elliptic and nearly obtuse, closely serrated towards the apex. *h.* 3ft. to 40ft. Himalaya and Japan, 1824. Greenhouse shrub or tree.

**S. japonica** (Japanese). *fl.* pale yellow, sub-sessile; racemes axillary, simple, shorter than the petioles, three to five-flowered. June. *l.* oblong- or obovate-elliptic, 2in. long, acute at both ends, glabrous, serrated; petioles ½in. long. *h.* 10ft. Japan, 1850. Greenhouse tree. (S. Z. F. J. 24, under name of *S. lucida*.)

**S. sinica** (Chinese). *fl.* white, fragrant; racemes compound, terminal and axillary, as long as the leaves. May. *l.* elliptic, 1½in. to 2in. long, acute at both ends, serrated, and, as well as the branches and branchlets, pubescent. *h.* 3ft. China, 1822. Greenhouse shrub. (B. R. 710.)

**S. Sumuntia** (Sumuntia). *fl.* whitish, small, produced in short, few-flowered spikes. Summer. *l.* narrowly elliptic, acute, serrulate, cuneate at base. Himalaya, 1883. An unattractive, stove shrub. (R. G. 1073, fig. c-g.)

**S. tinctoria** (dyer's). Horse Sugar; Sweet Leaf. *fl.* yellow, odorous, six to fourteen in close and bracted clusters. April. *l.* elongated-oblong, 3in. to 5in. long, acute, obscurely toothed, thickish, almost persistent, minutely pubescent and pale beneath. *h.* 3ft. South United States, 1780. Greenhouse shrub. The leaves are sweet, and are greedily eaten by cattle; after drying, they are used for dyeing yellow.

**SYMPODE, SYMPODIUM**. "A stem made up of a series of superposed branches in a way to imitate a simple axis; a Sympodial stem" (Asa Gray).

**SYN**. A term which, in Greek compounds, signifies union, adhesion, or growing together: e.g., *Synantherous*, stamens coalescent by their anthers; *Syncarpous*, composed of two or more united carpels.

**SYNADENIUM** (from *syn*, united, and *aden*, a gland; the glands of the involucre are united in a cup or disk). African Milk-bush. ORD. *Euphorbiaceæ*. A small genus (two or three species) of slightly fleshy, terete-branched, stove shrubs, natives of South and tropical East Africa. Flowers rather inconspicuous, in terminal, loosely corymbose, bi- or trichotomously-branched, cymes; involucre campanulate, regular, five-lobed, five-glanded, seated on a flat-concave cupule; males (on separate cymes) from twenty to thirty in five fascicles; females

**Synadenium**—*continued*.

solitary, with bifid, recurved stigmas. Leaves scattered, obovate, entire, rather thick. Only one species has been introduced. It thrives in a thoroughly well-drained, sandy loam, with the addition of a little well-rotted cow-dung. Propagation may be effected by cuttings, thoroughly dried at the base, inserted in sand, and occasionally very slightly moistened.

**S. Grantii** (Captain Grant's). *fl.* red-purple; involucre  $\frac{1}{2}$  in. in diameter; pedicels purplish; cymes axillary, corymbosely branched, 6 in. to 8 in. long, green; bracts appressed. November. *l.* 3 in. to 4 in. long, obtuse, not very succulent, dark green above, paler below. Stem stout, terete. *h.* 6 ft. to 10 ft. Central Africa, 1867. (B. M. 5633.)

**SYNANDRA** (from *syn*, together, and *aner*, andros, an anther; the posterior and sterile anthers are connate). **ORD. Labiate.** A monotypic genus. The species is a hardy, hairy, fibrous-rooted biennial, with the habit of *Lamium*, and requiring ordinary culture.

**S. grandiflora** (large-flowered). *fl.* white or nearly so, solitary in the bracts; corolla  $\frac{1}{2}$  in. long; filaments bearded. June. *l.* membranous, cordate, coarsely crenate, all but the floral ones (which are reduced to ovate, sessile bracts) long-petioled. *h.* 1 ft. to 2 ft. North America, 1827.

**SYNANDRA** (of Schrader). A synonym of *Aphelandra*.

**SYNANTHEREÆ.** Synonymous with *Compositæ*.

**SYNAPHLEBIUM.** Included under *Davallia* and *Lindsaya*.

**SYNARRHENA.** A synonym of *Mimusops* (which see).

**SYNCARPIUM.** A multiple fruit, as the Mulberry; or a fleshy, aggregate fruit, like that of *Magnolia*.

**SYNECHANTHUS** (from *syneches*, continuous, and *anthos*, a flower; in allusion to the arrangement of the inflorescence). **SYNS. Rathea, Reineckia.** **ORD. Palmæ.** A small genus, consisting of two Central American and one Columbian species of gregarious, unarmed, stove Palms. Flowers greenish or the males purplish, minute; spathes many, tubular, membranous, persistent; spadices many, on long and slender peduncles, erect in flowering, with straight, compressed or acipitous branches. Fruit reddish-yellow, shining, ellipsoid, one-seeded. Leaves terminal, equally pinnatisect; segments broad or narrow, membranous, acuminate, plicate-nerved, often interrupted, the margins recurved at base; rachis convex at back, deeply keeled above; petioles channelled above; sheaths short, opening. Trunk slender, annulate, often stoloniferous. *S. fibrosus*, the only species introduced, is an exceedingly graceful Palm, requiring similar treatment to *Chamædorea* (which see).

**S. fibrosus** (fibrous-rooted).\* *fl.* in two-ranked, short, linear clusters; spathes several; spadices one-third as long as the leaves; the branches many, very slender, forked. *fr.* orange-red, sessile, 1 in. to  $\frac{1}{2}$  in. long. *l.* 4 ft. long, erect and spreading; leaflets numerous, 1 ft. to  $\frac{1}{2}$  ft. long, spreading and rather pendulous, linear-lanceolate. Trunk 4 ft. high, green. Central America. (B. M. 6572.)

**SYNEDRAL.** Growing on the angles of a stem.

**SYNGENESIA.** A Linnean class, characterised by having Syngenesious anthers.

**SYNGENESIOUS.** Having the anthers united at their edges, so as to form a tube.

**SYNGONIUM** (from *syn*, confluent, and *gone*, the womb; alluding to the cohesion of the ovaries). **ORD. Aroidæ (Araceæ).** A genus comprising about eight species of stove, climbing shrubs, natives of tropical America. Flowers monœcious, the males and females remote; spathe tube ovoid, accrescent, persistent, the throat contracted, the lamina boat-shaped, at length deciduous; spadix inappendiculate, much shorter than the

**Syngonium**—*continued*.

spathe; peduncles fasciated or solitary, short. Leaves petiolate; primary ones sagittate; adults pedately three to nine-cut; petioles elongated; sheaths persistent, accrescent. The species introduced are described below. They are easily grown in a house where a high temperature and a moist atmosphere are maintained. An open compost of loam and peat, or leaf mould, to which some coarse sand should be added, is best; the plants are not, however, very fastidious regarding soil. Plenty of water and frequent syringings are essential in the summer or growing season; and no more shade should be applied than is requisite to keep the leaves from scorching. Propagated easily by dividing the stems into lengths consisting of about three joints, and inserting them in pots, in a brisk heat. These soon become established, and make new growth at the top. Any old plants which get too high for the house they occupy may have their tops cut off and inserted as large cuttings; these soon re-establish themselves.

**S. affine** (related). *fl.*, spathe green, the lamina yellowish within; peduncles very numerous, two to seven from one axil, slender, nearly equalling the spathe. *l.* acute; anterior lobes oblong-triangular; posterior ones trisected, sub-auriculate or auriculate; petioles twice or thrice as long as the leaves, sheathed above the middle. Brazil. **SYN. S. gracile.**

**S. auritum** (eared). Five Fingers. *fl.*, spathe tube purplish, cylindrical, the lamina ovate-oblong, shortly cuspidate, purplish at throat, the rest yellow; peduncles short. *l.* three or nearly five-cut; middle segment largest, broadly ovate-oblong, rounded and shortly cuneate towards the base; lateral segments inequilateral, falcate-oblong, auriculate. Branches green. Jamaica.

**S. gracile** (slender). A synonym of *S. affine*.

**S. podophyllum albo-lineatum** (foot-leaved, white-lined). *fl.*, spathe tube oblong-ovoid, the lamina cuspidate; peduncles many. *l.* at first sagittate; adults consisting of five to seven distant, oblong-lanceolate, acute segments; midrib and lateral nerves whitish; petioles elongated. Central America. **SYN. S. Seemannii.**

**S. Seemannii** (Seemann's). A synonym of *S. podophyllum albo-lineatum*.

**S. Vellozianum** (Velloz). *fl.*, spathe tube green, ovate, acuminate, the limb pale yellowish-green outside, whitish-green within; peduncles many, rather long, slender. *l.* at first rather broadly sagittate; petioles scarcely longer than the blade, sheathed above the middle. Young branches slender. Rio de Janeiro. *S. Reidelianum* is a form of this species with an oblong spathe tube, and shorter peduncles.

**S. Wendlandii** (Wendland's). *fl.*, spathe tube rather shorter than the oblong-lanceolate, cuspidate-acuminate lamina; spadix one-sixth shorter than the spathe; peduncle equalling the spathe tube. *l.* rather longer than the petioles, trisected, the segments oblong-lanceolate; young leaves sagittate. Caudex ascending; internodes green. Costa Rica.

**SYNGRAMME.** Included under *Gymnogramme*.

**SYNNETIA.** See *Synnotia*.

**SYNNOTIA** (named in honour of W. Synnot, who collected many plants at the Cape of Good Hope). Erroneously spelt *Synnetia*. **ORD. Iridæ.** A small genus (three species) of pretty, greenhouse, bulbous plants, natives of South Africa. Flowers rather large, sessile; perianth funnel-shaped, with erecto-patent, unequal lobes; stamens affixed at base of throat; spathes scattered at the sides of the stem, rather broad, cut or fimbriate-toothed at apex, one-flowered. Leaves few, flat, linear-ensiform, flaccid. Stem simple or very slightly branched. Propagation is readily effected by seeds; or by offsets, which are freely produced. Seeds should be sown in pans of sandy soil, about September, and placed in a cool frame. The young plants may remain in the seed-pans for the first year, when they should be either potted singly or planted out. Three or four years elapse before they flower. Propagation by offsets is a much quicker method, as the plants then generally flower the second year. *Synnotias*, cultivated as pot plants, are adapted for conservatory and cool greenhouse decoration, in spring. The bulbs should be potted rather firmly, in sandy loam and leaf soil, during October, placing about six or eight in a 5 in. pot, and covering

**Synnotia**—continued.

them with lin. of soil. The pots may then be plunged or stood on ashes in a cool frame, and but little water will be required throughout the winter. When the flowers appear, more water may be given, and the plants fully exposed to light and plenty of air: draughts, however, must be avoided. After flowering, growth and a gradual ripening should be encouraged, by keeping the plants watered for a time. When the leaves die away, the bulbs may be shaken out and stored in bags until the autumn, or they may be allowed to remain in the soil and be kept dry.

**S. bicolor** (two-coloured). *fl.* alternate, distant; perianth violet and yellow, the tube curved, the segments ovate; spathe  $\frac{3}{16}$  in. long; scape erect, 6 in. to 10 in. high, simple or branched, leafy. March. *l.* distichous, striated, acute,  $\frac{3}{16}$  in. broad. 1786. (B. H. ii. 25; B. M. 548, under name of *Lilia bicolor*.)

**S. galeata** (helmeted). *fl.*, perianth ringent, the three lower segments yellowish, the others white tinged with red. *l.* ovate-ensiform.



FIG. 560. FLOWERING BRANCH OF LILAC CHARLES X.

**S. variegata** (variegated).\* *fl.* alternate, distant; perianth yellow and violet, the tube elongated,  $\frac{1}{16}$  in. long, the uppermost segment erect, the two lateral ones recurved; scape terete, simple,  $\frac{1}{4}$  ft. high. May. *l.* ovate-lanceolate-ensiform, the lower ones distichous, the upper ones alternate. 1825. (S. B. F. G. 150.)

**SYNONYM.** In botany, a superseded or unused name.

**SYNSEPALOUS.** The same as **Gamosepalous** (which see).

**SYRINGA** (from *syrin*, *syringos*, a pipe; the branches are long and straight, and are filled with medulla). Lilac; Pipe-tree. Including *Ligustrina*. ORD. *Oleaceæ*. A well-known genus, comprising about ten species of ornamental, hardy, deciduous, glabrous or pubescent shrubs, natives of Eastern Europe and temperate Asia. Flowers disposed in terminal, thyrsoid or trichotomous panicles, the inflorescence at first centri-

**Syringa**—continued.

petal, ultimately often centrifugal; calyx campanulate, irregularly toothed; corolla tube cylindrical, rarely shortened; lobes four, shorter or longer than the tube, induplicate-valvate; stamens two, affixed nearly at the apex of the tube, the filaments short or filiform. Leaves opposite, entire or rarely pinnatisect. Nearly all the species, and many splendid varieties, have been introduced to our gardens. The common English name is said to have been derived from *Lilac* or *Lilag*, the Persian word for the flowers. The common Lilac, *S. vulgaris*, and its varieties, are the largest in the genus, and are also among the commonest and most beautiful of our spring-flowering shrubs.

**Propagation.** Lilacs may be readily increased by suckers, which are produced in abundance from the roots. Scarce or good varieties may be increased by means of shield-budding, using a pushing bud in April, or a dormant one in July. Crown-grafting or cleft-grafting in March is also practicable, either on stocks near the ground, or on others prepared as dwarf or tall standards. Seedling plants should be raised for stocks, as they are less likely to produce suckers, which would, in due course, deprive the bud or graft of its full amount of nutriment. Strong-growing varieties are usually worked near the ground, and the new shoot allowed to run up; others, of slender growth, are best united higher up on a more vigorous stock. The varieties may also be raised from cuttings.

**Cultivation.** Few shrubs are more universally grown and admired when in flower than the species and varieties of *Syringa*. They grow freely, and flower profusely outside in almost any soil and situation, but well repay any extra attention bestowed in removing suckers or giving a little good soil occasionally. They are also amongst the best of subjects for forcing in winter and early spring. One of the finest varieties for this latter purpose is Charles X. (see Fig. 560): its panicles of flowers are much larger and more compact than the so-called Persian Lilac of gardens (*S. chinensis*), which is, however, well adapted for treating in a similar way. In France, Lilacs are extensively forced in places where light is excluded. The flowers thus become, by blanching, pure white, and are in great request in the flower market for making bouquets, &c.; large quantities being sent annually to England, amongst other places. The common Lilac (*S. vulgaris*) is also amenable to blanching. It has been recently discovered that, if forced in a sufficiently heated structure, the colouring matter has no time to form in the flowers, and therefore the same results are obtained as if the plant were, according to the old recognised method, grown in a place where light was excluded.

Lilac flowers, when blanched pure white, have a very chaste and beautiful appearance. The process of blanching is best performed in a cellar or shed, from which all light can be excluded. A temperature of 55deg. or 60deg., with a moist atmosphere, should be maintained, and it should preferably be secured by fermenting material composed of stable litter and leaves. One disadvantage connected with blanching is the impossibility of obtaining any foliage to accompany the flowers. Leaves procured from other plants exposed to light may, however, be substituted.

**Forcing.** Lilac plants intended for forcing are best prepared by being grown purposely in pots; at any rate, they should be lifted and potted early in autumn, using any ordinary loamy soil, and afterwards standing



**Syringa**—*continued*.

them outside until required. Only those with plenty of flower-buds should be selected for forcing. The difference in flower and wood-buds is not always readily seen, as both are on the points of the shoots. Flower-buds are globose, and much more plump than the others, and may thus be distinguished. Light protecting material should be placed round the pots for the winter, and a few plants, as may be required, introduced to the forcing house at intervals of two or three weeks from November onwards. A moist temperature of 55deg. will be sufficient at first, as it is important that the flowers should be induced to start a little in advance of the leaves. When Lilacs are placed direct into a high temperature, growth is unduly excited, and the flowers often remain dormant, and eventually die away instead of opening. When flowering is over, the growths may be cut back to within 2in. of the starting point of the previous year. Lilacs do not answer well for forcing two years in succession; consequently, two



FIG. 561. FLOWERING BRANCH OF SYRINGA CHINENSIS.

batches should be kept, one to remain in the ground outside while the other is being forced. Where expense is not an object, beautiful plants may be purchased annually. They are imported from the Continent in large quantities, both as dwarfs and standards, and are all invariably well set with flower buds.

**Fungi.** Few Fungi ever do conspicuous harm to plants of this genus, and none are known to be really dangerous to their welfare. The only ones that call for even a passing reference are those that grow on the living leaves. These organs are occasionally more or less covered with a diffused white coat of hyphæ of **Oidium** (which see for remedies). Other plants show a dark coating of *Fumago vagans*, so widely diffused on almost all shrubby plants, especially when growing under trees infested by Aphides. Well syringing the leaves with clean water, or with soap-suds, will remove honey-dew, which serves as the food of the Fungus, and will also clear away the Fungus itself. In the North of

**Syringa**—*continued*.

Scotland, the leaves of Lilacs often show brown patches, with a green, watery border. These patches are the work of a Fungus, discovered by Mr. A. S. Wilson, and named by Mr. Berkeley *Ovularia Syringæ* (G. C., 19th Oct., 1881). Hyphæ are pushed out through the stomata of the leaves, and each bears on the tip a pear-shaped spore, fixed by the broader end. Mr. W. G. Smith has described the sexual spores of this Fungus. They are formed on the decaying, fallen leaves. The best remedy is to gather and burn such leaves in autumn. The leaves of Lilacs are apt to be disfigured by dry spots, the work of various Fungi, e.g., *Asteroma vagans*, *Cercospora Lilacis*, *Phyllosticta Syringæ*, *Septoria*

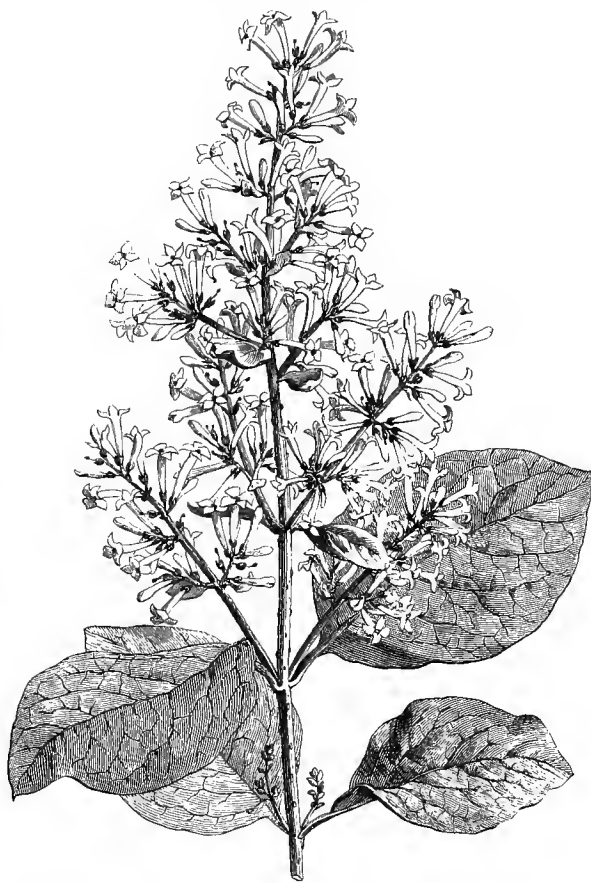


FIG. 562. FLOWERING BRANCH OF SYRINGA EMODI.

*Syringæ*, &c.; but it would be useless to enter into a description of these so-called species, as they are only stages in the development of others, probably *Pyrenomyces*, not yet ascertained; and the effects are much alike with all of them. A few of these have not yet been recorded as British. The Lilacs seem little the worse for their presence. Probably, burning the fallen leaves would be found sufficient to prevent the disfigurement from spreading.

**Insects.** Insect pests are not dangerous. They are chiefly the larvæ of a few Moths; e.g., the Privet Hawk-moth (see **Sphingidæ**), one or two *Noctuæ* and Geometers, and one of the *Tineina*, named *Gracilaria syringella*. The last-mentioned causes the most conspicuous damage, as it

**Syringa**—continued.

is very common. Its larva burrows in the leaves, and forms an irregular mine, ending in a pale blotch. After a time, it leaves the mine, and rolls up the leaf into a tube for its own protection, till full-fed, when it drops to the soil, and becomes a pupa below ground. The moth is about  $\frac{1}{2}$  in. in spread of wings: these are yellowish-white, with a basal patch, a blotch on the inner margin, and three oblique bars (all brown). The leaves should be picked off while the larvæ are in them, and may be crushed or burned. The larvæ of the other Moths are all much larger than the *Gracilaria*. They may be exterminated by shaking the bushes over anything placed below, to receive the insects as they fall.



FIG. 563. FLOWERING BRANCH AND LEAF OF SYRINGA JAPONICA.

**S. amurensis** (Amur). A synonym of *S. japonica*.

**S. chinensis** (Chinese). Rouen Lilac. *fl.* of an intense violet colour; corolla limb flat. May and June. *l.*, including the petioles, six to seven lines long, ovate-lanceolate, slightly acute at the base, acuminate at apex, highly glabrous. *h.* 4 ft. 1795. This plant varies somewhat in the colour of its flowers. It is regarded by some authors as a hybrid between *S. persica* and *S. vulgaris*. See Fig. 561. SYNS. *S. dubia*, *S. rothomagensis*.

**S. dubia** (doubtful). "Persian Lilac." Erroneously called *S. persica* in gardens. A synonym of *S. chinensis*.

**S. Emodi** (Mount Emodus).\* *fl.* purplish or white, often fasciated; corolla tube  $\frac{1}{2}$  in. long, lobes  $\frac{1}{2}$  in. long; panicles dense-flowered. April. *l.*  $3\frac{1}{2}$  in. long,  $1\frac{1}{2}$  in. broad, elliptic or ovate, acute at

**Syringa**—continued.

both ends, glabrous; secondary nerves prominently reticulated beneath; petioles  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. *h.* 6 ft. Himalayas, 1840. See Fig. 562. (B. R. xxxi. 6.)

**S. E. variegata** (variegated). This differs from the type in having the leaves blotched with dull yellow.

**S. japonica** (Japanese). *fl.* creamy-white, in a dense-flowered thyrse. Summer. *l.* broad-ovate, acuminate, with a rounded or sub-cuneate base, glabrate above; midrib and veins pubescent beneath. Japan, &c. A handsome shrub. See Fig. 563. (G. C. n. s., xxv. 561.) SYNS. *S. amurensis*, *Ligustrina amurensis*.

**S. Josikæa** (Countess von Josika's).\* *fl.* bluish-purple, scentless; corolla limb slightly concave; pedicel not exceeding the calyx. May. *l.* elliptic-lanceolate, acute, wrinkled, slightly ciliated, glabrous, intense green and shining above, whitish beneath; petioles of the upper leaves two to three lines long. *h.* 5 ft. to 10 ft. Hungary, 1835. (B. 24; B. M. 3278; B. R. 1733.)

**S. oblata** (oblate). *fl.* purple, profusely produced in very ornamental bunches; cup of the calyx more acutely four-toothed than in the common Lilac. May. *l.* very striking, large, rather fleshy, oblately cordate. China, 1850. About the size of the English Lilac, but more tree-like in general outline. There is a white-flowered variety.

**S. persica** (Persian). *fl.* bluish-purple or white, the limb rather flat. May and June. *l.* lanceolate, acute, highly glabrous, sometimes parted or pinnatifid. *h.* 4 ft. to 5 ft. Persia, 1640. The smallest species of the genus.

**S. p. integrifolia** (entire-leaved). *l.* all undivided. (B. M. 486, under name of *S. persica*.)



FIG. 564. BRANCH, IN FRUIT, OF SYRINGA PERSICA LACINIATA.

**S. p. laciniata** (torn). *l.* all, or nearly all, incise-pinnatifid. See Fig. 564. (L. B. C. 1107.)

**S. rothomagensis** (Rouen). A synonym of *S. dubia*.

**S. villosa** (villous). *fl.* bluish-purple; corolla-tube slender, the limb with oblong, reflexed lobes. May. *l.* ovate or ovate-elliptic,

**Syringa**—continued.

rather obtuse, glabrous above, pilose on the principal nerves beneath. *h.* 3ft. to 6ft. North China, 1830.

**S. vulgaris** (common). \* Common Lilac; Pipe-tree. *fl.* red, blue, or white; corolla limb slightly concave. May. *l.* cordate or ovate-cordate, highly glabrous. *h.* 8ft. to 20ft. or more. Persia, Hungary, &c., 1597. Many beautiful varieties, of which the following are a selection, are referred to this species.

**S. v. alba** (white). \* *fl.* white; thyrse ample, clustered. Branches and buds greenish. *h.* 12ft. to 15ft. There are two sub-varieties: *major*, with larger, and *plena*, with double, flowers.

**S. v. cœrulea** (blue). *fl.* slightly rosy, at length becoming blue; thyrse sparingly clustered. *h.* 12ft. A sub-variety has the leaves imperfectly variegated.

**S. v. grandiflora** (large-flowered). *fl.* red, large.

**S. v. purpurea** (purple). *fl.* violet-purple; thyrse ample, crowded. Branches and buds purplish.

**S. v. violacea** (violet). Scotch Lilac. *fl.* of a beautiful violet or lilac; thyrse sparingly clustered. Branches and buds purplish. *h.* 10ft. (B. M. 183.)

**GARDEN VARIETIES.** A select list of garden varieties is given below:

**ALBA GRANDIFLORA**, flowers white, large, one of the best; **ALBA MAGNA**, one of the finest whites; **ALBA VIRGINALIS**, flowers snowy-white, trusses large, good for forcing; **ALPHONSE LAVALLEE**, flowers sky-blue, shaded with violet, double, in very large trusses; **CHARLES X.**, flowers deep purplish-lilac when grown outside, white when forced, very large trusses, extra fine, one of the best for forcing; **DR. LINDLEY**, flowers reddish-lilac, in extremely large clusters; **LE GAULOIS**, flowers dark peach-colour, with light centres, very double, in large, close trusses; **LEMOINEI**, flowers pale ashy-lilac, double; **MATHIEU DE DOMBASLE**, flowers reddish-mauve, double, trusses nearly 1ft. long; **MICHEL BUCHNER**, flowers pale lilac, rose-margined, double, in line, erect, pyramidal trusses; **RANUNCULIFLORA**, flowers dark red, becoming lilac, double; **RENONCULE**, flowers azure-mauve, strongly perfumed, double, very full; **RUBELLA PLENA**, flowers vinous-red, changing to rosy-violet, double.

**SYRINGA, MOCK.** A common name for **Philadelphus coronarius** (which see).

**SYRINGODEA** (from *syrrigodes*, fistular; in reference to the slender perianth tube). ORD. *Iridæ*. A small, South African genus (three species) of pretty, dwarf, greenhouse herbs. Flower solitary in the spathe, subsessile or shortly pedicellate; perianth salver or funnel-shaped, with a long and very slender tube and sub-equal, spreading lobes; stamens affixed to the throat: spathes sub-sessile within the leaves, narrow, hyaline. Leaves filiform. Only the typical species, *S. pulchella*, has been introduced. For culture, see **Ixia**.

**S. pulchella** (rather pretty). *fl.*, perianth tube cylindrical, 1½ in. to 2 in. long, thickened above; limb pale purple, the segments

**Syringodea**—continued.

obovate-cuneate, deeply emarginate; spathe valves lanceolate, ¼ in. to ¾ in. long. Autumn. *l.* four to six, setaceous, falcate, glabrous, 3 in. to 4 in. long. Bulb globose, thick, one-flowered. South Africa, 1873. A very pretty plant. (B. M. 6072; F. d. S. 2096.)

**SYRINGODEA** (of Don). Included under *Erica*.

**SYRPHUS.** A genus of two-winged flies (*Diptera*) popularly known as "Hawkflies," because of their rapid, darting flight. They are partial to settling on flowers; and most of them are conspicuous because of the bright spots of yellow, and the metallic greens and other hues, that they bear. They mostly vary in size between a common Housefly and a Bluebottle Fly; and some of them are a good deal the same shape as the latter insect. Hawkflies are mostly smooth-bodied; but, in several genera allied closely to *Syrphus* (e.g., *Volucella*), the species are hairy, and some look much like small Humble-bees. There are numerous species in the genus *Syrphus*, a good many of which are British. The larvæ are of much assistance to gardeners, by destroying the Aphides, or Green-flies. The larvæ of the various species are much alike; all of them are fleshy, and taper from the hinder end to the pointed anterior part, in which is situated the mouth. The body is ringed, and the larva moves very much as a leech does, by contracting and lengthening its body. The female fly lays her eggs on twigs infested by Aphides. The larvæ, so soon as hatched, begin to feed on these insects, seizing them one by one, holding each in the air till sucked dry, and then seizing and sucking another. When full-fed, the larvæ fix themselves by the tails, by means of a cement, to twigs of the plants, and, usually in a few days, the flies emerge. They should not be injured by gardeners, but should be protected as far as possible.

**SYSTREPHIA.** A synonym of **Ceropegia** (which see).

**SYZYGIUM.** Included under **Eugenia** (which see).

**SZOWITZIA** (named after M. Szovitz, a Hungarian botanist and traveller, who died in 1831). ORD. *Umbelliferae*. A monotypic genus. The species is a slender, hardy, glabrous, annual herb, native of the South Caucasus region. It has slender, compound umbels of white flowers, and ternate, dissected leaves. Having little beauty, it is probably lost to cultivation.



# THE DICTIONARY OF GARDENING,

## An Encyclopædia of Horticulture.

The following are the Abbreviations used:—*fl.* flowers; *fr.* fruit; *l.* leaves; *h.* height; *deg.* degrees;  
*rhiz.* rhizomes; *cau.* caudex; *sti.* stipes.

The Asterisks (\*) indicate plants that are especially good or distinct.

**TABEBUIA** (said to be the native name in Brazil).  
ORD. *Bignoniaceæ*. A genus embracing nearly sixty species of stove, glabrous, pubescent, or villous, erect trees or shrubs, natives of tropical America. Flowers often ample, racemose or cymose; calyx tubular, at first closed, afterwards variously cut at apex; corolla tube elongated, straight or scarcely incurved; limb spreading, sub-bilabiate, of five rounded, nearly equal lobes; stamens four, didynamous. Capsules oblong or elongated, subterete. Leaves opposite or slightly scattered, simple (one-foliate?), trifoliate, or often digitately five to seven-foliate; leaflets petiolulate, entire or toothed. Few of the species are in cultivation. They require precisely similar treatment to that recommended for *Tecoma* (under which these plants are sometimes included).

**T. æsculifolia** (Horse Chestnut-leaved). *fl.*, corolla orange-colored, sub-campanulate, the three lower lobes marked with yellow spots; panicle terminal, sub-corymbose. June. *l.* digitate; leaflets seven, obovate-oblong, shortly acuminate, narrowed at base, membranous, pubescent above, canescent-tomentose beneath. Branchlets pubescent. *h.* 20ft. Mexico. Tree. SYN. *Bignonia æsculifolia*.

**T. chrysanth** (golden-flowered). This is the correct name of the plant described in this work as *Bignonia chrysanth*. SYN. *Tecoma chrysanth*.

**T. leucoxyla** (white-wooded). This is the correct name of the plant described in this work as *Bignonia pallida*. SYN. *Bignonia leucoxyla* (of Velloso).

**T. serratifolia** (serrate-leaved). *fl.*, corolla yellow, glabrous, 2in. to 2½in. long, narrowly infundibular; corymbs contracted. *l.* chartaceous, devoid of scales; leaflets five, 3in. to 5in. long, oblong-lanceolate, shortly acuminate, sub-entire. *h.* 20ft. West Indies, 1822. Tree. SYN. *Tecoma serratifolia*.

**T. spectabilis** (showy).\* This is the correct name of the plant described in this work as *Bignonia spectabilis*. SYN. *Tecoma spectabilis* (F. d. S. 948).

**TABERNÆMONTANA** (named in honour of James Theodore Tabernæmontanus, of Heidelberg, a celebrated physician and botanist, who died in 1590). SYN. *Pandaca*, *Reichardia* (of Dennstaedt). Including *Conopharyngia*. ORD. *Apocynaceæ*. A genus comprising about 110 species of stove, evergreen, often glabrous trees or shrubs, broadly dispersed over tropical regions. Flowers

### Tabernæmontana—continued.

white or yellowish; calyx usually small, five-lobed or five-parted; corolla salver-shaped, the throat not scaly, the lobes contorted; anthers sagittate, very acute; cymes scarcely branched. Berries or follicles two, globose, oblong, ovoid, or recurved-reniform, smooth or three-ribbed. Leaves opposite, slender or coriaceous, pinniveined. The species, a select few of which are here described, are interesting plants. *T. utilis* (a species probably not in cultivation), when tapped, yields a copious supply of thick, sweet milk, resembling that of the cow in appearance, but in substance rather sticky, owing to the presence of caoutchouc. A mixture of loam, sand, and peat, is the most suitable soil for Tabernæmontanae. Young plants are obtainable by means of cuttings, inserted in sand, under a glass, in moist heat. Except where otherwise indicated, all the under-mentioned species are shrubs, having white flowers.

**T. Amsonia** (Amsonia). A synonym of *Amsonia Tabernæmontana*.

**T. amygdalifolia** (Almond-leaved). *fl.* highly odorous; corolla segments obovate, undulated, nearly equal to the tube; cymes dichotomous, one-third to half the length of the leaves. July. *l.* oval-lanceolate or obovate-oblong, acute at both ends, 2in. to 5in. long, shining; petioles ½in. to ¾in. long. *h.* 6ft. South America, 1780. (B. R. 333.)

**T. Barteri** (Barter's).\* *fl.* 1in. long; corolla tube slightly dilated at base and apex, the segments oblong-obovate, obtuse, rather shorter than the tube; peduncles dichotomously branched, few-flowered, shorter than the leaves. Summer. *l.* oblong, attenuated at both ends, the upper ones 2in. to 3in. long, in unequal whorls; petioles dilated and slightly connate at base. Branches pale. *h.* 6ft. Western tropical Africa, 1870. (B. M. 5859.)

**T. coronaria** (crowned).\* Adam's Apple; East Indian Rose Bay. *fl.* odorous at night; corolla tube 2in. long, the segments oblong, obtuse, rather longer than the tube; peduncles in pairs from the forks of the branches, erect, dichotomous, four to six-flowered. July. *l.* opposite, unequal, elliptic-oblong, acute at base, obtuse and acuminate at apex, 3in. to 4in. long, membranous. Branches dichotomous. *h.* 4ft. Native country unknown; cultivated throughout India. 1770. (B. R. 1064; L. B. C. 406.) There is a double-flowered form, *flore-pleno*. (B. M. 1865, under name of *Nerium coronarium*.)

**T. densiflora** (dense-flowered). A synonym of *Rauwolfia densiflora*.

**Tabernaemontana**—continued.

**T. dichotoma** (dichotomous). *fl.* slightly odorous, lin. long; corolla segments slightly exceeding the tube; cymes terminal, dichotomously branched, many-flowered, nearly equalling the leaves; peduncles naked, 3in. to 6in. long. September. *l.* oblong, acute at base, obtuse at apex, 2½in. to 5in. long; petioles six to ten lines long, embraced by the sheath-like stipules. Branches terete. *h.* 6ft. India, 1840. (B. R. 1841, 53.) SYN. *Cerbera dichotoma* (L. B. C. 1516).

**T. grandiflora** (large-flowered). *fl.* yellow, inodorous; calyx lobes ¾in. long, leafy, gland-bearing towards the base; corolla tube fourteen lines long, the lobes obovate, very obtuse, shorter; peduncles terminal, twice-forked, few-flowered. Summer. *l.* oval or elliptic-obovate, acute at base, long and acutely cuspidate at apex, 2in. to 4in. long, one in each pair smaller, glabrous. Branchlets dichotomous. *h.* 6ft. British Guiana and Venezuela, 1823. (B. M. 5226.)

**T. gratissima** (very sweet-scented). A synonym of *T. recurva*.

**T. laurifolia** (Laurel-leaved). *fl.* yellow; corolla lobes linear-oblong, shorter than the tube; cymes contracted; peduncle about as long as the petioles. May. *l.* oval or oval-oblong, 4in. to 8in. long, blunt at both ends. *h.* 10ft. West Indies, 1768. Stove shrub. (B. R. 716.)

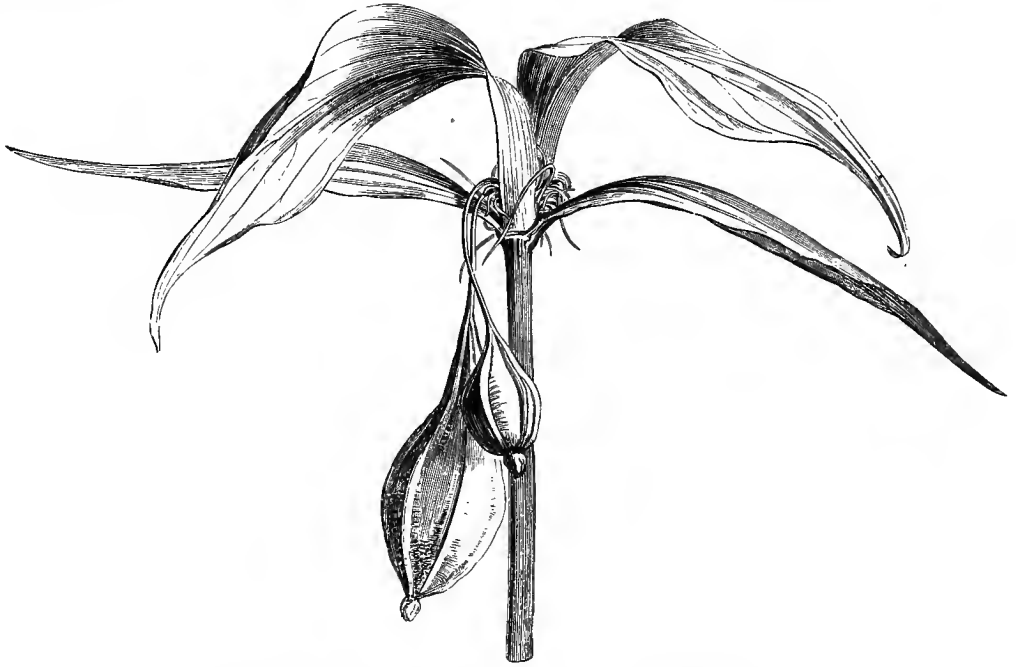


FIG. 1. UPPER PORTION OF SCAPE, WITH FRUITS, OF *TACCA PINNATIFIDA*.

**T. longiflora** (long-flowered). *fl.*, corolla tube very long, slightly swollen below the middle; peduncles lax, about three-flowered. Summer. *l.* oblong-elliptic, abruptly acuminate, acute at base; petioles dilated at base. Sierra Leone, 1849. Tree. (B. M. 4484; F. d. S. 534.)

**T. longifolia** (long-leaved). *fl.* ¾in. long; corolla lobes obovate-oblong, reflexed, equalling the tube; cymes axillary, dichotomous, many-flowered, much shorter than the leaves; peduncles thick. July. *l.* sub-sessile, oblong, acuminate, long-narrowed at base, 6in. to 10in. long, 1½in. to 2½in. broad, membranous. *h.* 6ft. British Guiana, 1849.

**T. recurva** (recurved). *fl.* fragrant; corolla tube glabrous, the throat fleshy, the segments eight to nine lines long, obtuse; cymes twin in the forks of the branches, spreading, recurved, much shorter than the leaves, many-flowered. June. *l.* broadly lanceolate, acute at base, obtuse and acuminate at apex, 4in. long; petioles four to six lines long. Branches terete. *h.* 6ft. Chittagong and Tenasserim, 1824. SYN. *T. gratissima* (B. R. 1084).

**T. Wallichiana** (Wallich's). *fl.* on pedicels twice as long as the calyx; corolla tube four to five lines long, the lobes narrow, falcate, rather obtuse; peduncles twin in the forks of the branches, spreading-recurved, dichotomous, three to five-flowered. Summer. *l.* broadly lanceolate, very shortly narrowed into the petioles, obtuse and acuminate at apex, 3in. to 4in. long; petioles very short, channelled. *h.* 2ft. to 3ft. Sumatra, 1873.

**TABLE MOUNTAIN PINE.** See *Pinus pungens*.

**TACAMAHAC.** See *Populus balsamifera*.

**TACCA** (the Malay name). SYN. *Ataccia*. ORD. *Taccaceæ*. A genus comprising about nine species of stove, perennial herbs; three are natives of tropical America, and the rest inhabit various tropical regions. Berry (? always) indehiscent. Other characteristics those of the order (which see). The species best known to cultivators are here described. The tubers of *T. pinnatifida* contain a great deal of starch, known as South Sea Arrowroot, and largely employed as an article of diet throughout the tropics. A compost of loam, peat, and sand, is most suitable for the culture of these plants. They must be very sparingly watered while in a dormant state. Propagation may be effected by division of the roots.

**T. artocarpifolia** (Artocarpus-leaved). *fl.* very numerous, on pedicels lin. to 3in. long, the sterile, pendulous ones filiform;

perianth brown at base, the rest green, glabrous, the segments broadly ovate; involucre of six or seven leaves; scape 5ft. to 6ft. high. May. *l.* about three, 2ft. to 3ft. in diameter, trisected; segments stalked, pinnatifid; petioles 2ft. long, stout, erect. Root tuberous. Madagascar, &c., 1872. (B. M. 6124.)

**T. aspera** (rough). A synonym of *T. integrifolia*.

**T. cristata** (crested). *fl.* dull purplish-brown, numerous, in a nodding, lateral umbel; involucre of four leaves, the lower ones smaller, sessile, the two upper large, flat, erect, purple in colour. Summer. *l.* lanceolate-oblong, with long, channelled, cylindrical petioles. *h.* 1½ft. to 2ft. Malaya, 1812. (B. M. 4589.) SYN. *Ataccia cristata* (F. d. S. 860-1; F. M. 388; L. J. F. 186-7; R. H. 1866, 51).

**T. integrifolia** (entire-leaved).\* *fl.* four to eleven, long-pedicellate, at first sub-erect, at length nodding; perianth green, variegated with purple and yellow; spathes ovate, twisted; scapes axillary, solitary. June. *l.* shining-green, recurved, oblong, acuminate, 8in. to 16in. long. Stem none or very short. Chittagong, 1810. (B. M. 1488.) SYN. *T. aspera*.

**T. lævis** (smooth). *fl.* six to twelve, umbellate; perianth greenish-violet, with a cup-like, sessile tube; involucre four-leaved; scapes axillary, solitary, shorter than the petioles. July. *l.* oblong, acuminate, glabrous, about 1ft. long. Stem none. Silhet, Khasya, Assam, Birma, &c., 1820.

**T. pinnatifida** (pinnatifid).\* Otaheite Salap-plant; South Sea



**Tacca**—continued.

Arrowroot-plant. *fl.* in a dense umbel, subtended by several leafy bracts; perianth purplish, funnel-shaped, with six sub-equal segments. June. *fr.* somewhat pear-shaped, with prominent ribs. *l.* long-petiolate, large, three-parted, the forked divisions pinnatifid down to a narrow wing, with irregular, ovate, acute segments. Stem none. Rhizome tuberous. East Indies and Society Islands, 1793. See Fig. 1. (L. B. C. 692; R. G. 582.)

**TACCACEÆ.** A small natural order of perennial herbs, with tuberous or creeping rhizomes, inhabiting tropical regions and China. Flowers regular, hermaphrodite, densely umbellate at the apex of an erect, leafless scape; perianth often brown, lurid, or green above, above the ovary broadly urceolate or globose-campanulate, the tube short and broad; lobes six, biseriate, sub-equal or the inner ones broader, all connivent in a globe or the outer ones (or all) spreading; stamens six; filaments very short; anthers two-celled; ovary inferior; style short, columnar; outer bracts herbaceous or coloured; inner ones long, filiform. Fruit globose, ovoid, turbinate, or elongated, often trigonous or six-ribbed, baccate, indehiscent or rarely at length three-valved. Leaves radical, large, petiolate, sometimes undivided and entire, occasionally variously lobed and dissected. The order consists of two genera—*Schizocapsa* and *Tacca*—and includes only about ten species.

**TACCARUM** (name adapted from *Tacca*, from the resemblance to that genus). *SYNS.* *Endera*, *Lysistigma*. *ORD.* *Ardoideæ* (*Aracææ*). A small genus (three or four species) of tall, stove, tuberous, Brazilian herbs. Flowers monœcious; spathe erect, the tube short and convolute, the blade gaping or explanate, oblong, acute; spadix in-appendiculate, shorter than the spathe, shortly stipitate, loose-flowered, the male inflorescence ovoid or elongated longer than the petioles. Leaves long-petiolate, broadly hastate-ovate, bipinnatifid; pinnae undulate. Two of the species have been introduced. They are closely allied to *Staurostigma* (which see for culture).

**T. peregrinum** (foreign). *fl.*, spathe olive-green, ovate, acuminate, slightly exceeding the spadix; spadix sub-cylindrical, attenuated from the base to the apex, clothed throughout with flowers, the male and female inflorescences of equal length. *l.* solitary, cotermporary with the flowers, large, tripartite, pinnatifid compound; petioles long, terete, spotted, 3ft. high. Tuber sub-hemispherical. 1873. *SYNS.* *Endera conophalloidea* (R. G. 732), *Lysistigma peregrinum*.

**S. Warmingianum** (Dr. Warming's). *fl.*, spathe light coppery-tinted brown, 1½ft. long, convolute below, open above; spadix shorter than the spathe; ovaries green, surrounded by four to six fleshy, dirty-brown staminodia; stamens of male flowers united into a thick, fleshy, round-topped, pinkish column; scape 8in. long. October to January. *l.* solitary, bright green, with a spread of 2ft. to 2½ft., having three principal bipinnatifid divisions; petiole 3ft. high, stout, light green, marked with numerous white lines. 1882. (G. C. n. s., xvi., p. 661; R. G. 1124.)

**TACHIA** (of Persoon). A synonym of *Tachigalia* (which see).

**TACHIADENUS** (from *Tachia*, a genus of the same order, and *aden*, a gland; the ovary is surrounded by a ring of glands, as in *Tachia*). *ORD.* *Gentianææ*. A genus including five species of stove herbs or sub-shrubs, endemic in Madagascar. Flowers pink or white, sometime violet with a white tube, large, few in a terminal cyme, or solitary; calyx tubular, multi-glandular within, five-cleft at apex, five-keeled or five-winged; corolla salver-shaped or funnel-like, with a long tube and five spreading, twisted lobes; stamens five. Leaves sessile or stalked, often three-nerved. Only one species has been introduced. It thrives in a mixture of sand, loam, and peat, and requires to be kept rather dry in winter. Propagated by cuttings, inserted in sand, under a hand glass, in heat.

**T. carinatus** (keeled).\* *fl.*, calyx ¾in. long, the obverse wings half-linear, the lobes linear; corolla tube white, 2in. long, swollen at apex, the lobes violet, rounded, obtuse, less than lin. long; cyme terminal, twice dichotomous. October. *l.* oval, sessile, three-nerved. Stem suffrutescent, tetragonal. 1858. (B. M. 5094.)

**TACHIGALIA** (*Tachigali* is the native name in Guiana). *SYNS.* *Cubæa*, *Tachia* (of Persoon). *ORD.* *Leguminosææ*. A small genus (four or five species) of tropical American, unarmed, stove trees. Flowers yellow (?), very shortly pedicellate, racemose; calyx segments five, unequal; petals five, scarcely unequal; stamens ten. Leaves abruptly pinnate. *T. bijuga* and *T. paniculata* have been introduced, but are now probably lost to cultivation.

**TACSONIA** (from *Tacso*, the Peruvian name of one of the species). Passion Flower. Including *Poggen-dorffia*. *ORD.* *Passiflorææ*. A genus comprising about thirty species of stove or greenhouse, often pubescent, climbing shrubs, natives of tropical America, mainly differing from *Passiflora* in the usually long, cylindrical tube of the calyx, which is furnished with two crowns, one at the throat, and the other near its base. Petals five, often smaller than the calyx lobes; corona entire or filamentose; stamens five. Leaves alternate. Tendrils lateral, undivided. The species known to cultivation are here described. For culture, see *Passiflora*.

**T. Buchananii** (Buchanan's). A synonym of *Passiflora vitifolia*.

**T. insignis** (remarkable).\* *fl.* solitary, axillary, 6in. to 8in. in diameter; tube 2in. long, with a depressed bulb at the base; sepals violet-crimson, linear-oblong, concave, with a green keel terminating below in a green spur 1in. long; petals darker crimson and shorter than the sepals, nearly flat; corona ¾in. long, of one series of white threads mottled with blue; inner corona an inflexed membrane at the base of the tube above the bulb. Summer and autumn. *l.* 5in. to 7in. long, ovate or oblong, or lanceolate-ovate from a cordate base, obscurely lobed, toothed; petioles short, stout, glandular; stipules small, pinnatisect. Young parts, petioles, peduncles, and leaves beneath, clothed with pale or dark rusty-brown wool. Fern (?). Warm greenhouse. (B. H. 1874, 10; F. M. n. s. 89; G. C., 1873, 1112.) *SYN.* *Passiflora insignis* (B. M. 6069; F. d. s. 2083-4.)

**T. manicata** (collared).\* *fl.* on peduncles which are longer than the petioles; tube inflated at base, ten-lobed; limb vivid scarlet, 4in. in diameter; corona double; the outer at the mouth of the tube, of many short, blue hairs; the inner at the top of the inflated base of the perianth; bracts elliptic-ovate, pubescent. July. *l.* about 4in. long, coriaceous, three-lobed to about the middle, finely serrate; lobes broadly oblong, obtuse or sub-acute, paler beneath; petioles about 1in. long, with three or four glands. Stem, leaves beneath, stipules, bracts, and perianth externally, finely pubescent. Peru, before 1850. Stove or warm greenhouse. (L. & P. F. G. i. 26.) *SYN.* *Passiflora manicata* (B. M. 6129).

**T. mixta** (mixed). *fl.* pink; tube cylindrical, 4in. to 5in. long, glabrous or pubescent; sepals and petals obtuse; bracts oblong, 1½in. to 2in. long, herbaceous or coloured, coalescing in an involucre. Late summer. *fr.* ovoid, glabrous or pubescent, edible. *l.* coriaceous, orbicular, three-lobed to the middle; lobes ovate-oblong, acute, serrated; petioles 1in. to 1½in. long, with six to eight sessile or stipitate glands. Stem angular. Andes. Plant glabrous or more or less pubescent. Greenhouse.

**T. m. eriantha** (woolly-flowered). *fl.* pink; bracts reticulate-nerved. Plant snowy-pubescent. (B. M. 5750, under name of *T. eriantha*.)

**T. m. quitensis** (Quito). *fl.*, involucre pubescent, cylindrical, equally or rarely unequally three-lobed at apex. *l.* nearly glabrous above, velvety beneath, three-lobed; lobes ovate or ovate-oblong; petiolar glands sessile. Stem velvety. (I. H. xvi. 595, under name of *T. quitensis eriantha*.)

**T. m. speciosa** (showy). *fl.*, involucre pubescent, unequally two or three-lobed at apex. *l.* glabrous above, pubescent beneath, three-lobed; lobes oblong-lanceolate, uncinately serrated; petiolar glands stipitate. Stem sub-terete, glabrous.

**T. mollissima** (very soft).\* *fl.* pink; tube cylindrical, 4in. to 5in. long, highly glabrous; bracts 1in. long, forming an urceolate involucre, irregularly cut at the top. August. *fr.* yellowish, ellipsoid, 4in. long. *l.* 4in. to 5in. long, 5in. to 6in. broad, cordate-trilobed; lobes diverging, ovate-lanceolate, serrated; petioles 1½in. long, glandular; stipules six to eight lines long, deeply serrated. Quito, 1845. Whole plant softly pubescent. Greenhouse. (B. H. vii., p. 142; B. M. 4187; B. R. xxxii. 11; F. d. s. ii. 70; P. M. B. xiii. 25.)

**T. Parrita** (Parrita's). *fl.*, tube long and slender; sepals five, rosy-orange, oblong-hooded, acute-pointed; petals rich orange, oblong, flat; corona consisting of an outer row of tooth-like projections, and an inner membranous fold bent downwards; stalks cylindrical, longer than the leaves. *l.* three-lobed, glabrous above, pilose beneath; petioles channelled above; stipules entire, subulate-acuminate. Tolima, 1882. Stove or greenhouse. (G. C. n. s., xvii., p. 225.)

**T. pinnatistipula** (pinnate-stipuled). *fl.* pale rose-colour, 4in. to 6in. long; tube cylindrical, dilated at base; coronal filaments

**Tacsonia**—continued.

one-half shorter than the sepals and petals; bracts lin. long, serrated; peduncles 4in. long. September. *fr.* sub-globose, tomentose, edible. *l.* coriaceous, tomentose beneath, tripartite, 3in. to 5in. long, 3½in. to 4in. broad; lobes lanceolate, serrated; petioles lin. long; stipules lin. long, pinnatisect. Chili and Peru, 1828. Greenhouse. (B. iv. 171; B. M. 4062; S. B. F. G. ser. ii. 156.) *SYN. Passiflora pinnatistipula* (B. R. 1536). *Poggen-dorfia rosea* is simply a monstrous form of this species.

**T. Van-Volkemii** (Van Volkem's). \* *f.* scarlet, very showy; tube cylindrical, 1½in. long, dilated at base, the limb 4in. to 5in. in diameter; sepals and petals linear-oblong; peduncles slender, twice as long as the leaves; bracts lin. long, serrated. Late summer. *fr.* ellipsoid, edible. *l.* glabrous, 4in. to 5in. long and broad, tripartite; lobes lanceolate, narrowed at base; petioles 1½in. long, with many glands; stipules linear. New Grenada, 1866. Stove or warm greenhouse. One of the finest species. (B. M. 5571; F. M. 289; G. C. 1866, p. 171; I. H. x. 381.)

**TENIOCARPUM.** A synonym of **Pachyrhizus** (which see).

**TENIOPHYLLUM** (from *tainia*, a band, and *phyllon*, a leaf; in reference to the linear leaves). **ORD. Orchidæ.** A genus embracing about half-a-dozen species of stove or greenhouse, dwarf, epiphytal Orchids, almost stemless and leafless, or with a tuft of linear leaves; they are natives of the East Indies, the Malayan Archipelago, the Pacific Islands, and Australia. Flowers minute, in small racemes; sepals and petals nearly equal, erect or connivent, connate at base; lip adnate to the column at base, and produced into a short spur or pouch; pollen masses four, in two pairs. None of the species have been introduced.

**TENIOPSIS.** Included under **Vittaria** (which see).

**TENITIS** (from *tainia*, a fillet or ribbon; alluding to the linear pinnae). Including *Cuspidaria*, *Neurodium*, *Paltonium*, and *Pteropsis*. **ORD. Filices.** A small genus (five species) of interesting, stove Ferns, all tropical, but not very closely allied. Sori linear, but the line sometimes interrupted, central or sub-marginal. Some of the species scarcely differ from *Tenioopsis* [included under *Vittaria*] in fruit, but in all those placed here the veins anastomose. The following species have been introduced. For culture, see **Ferns**.

**T. angustifolia** (narrow-fronded). *fronds* 1ft. to 1½ft. long, ½in. to ¾in. broad, narrowed very gradually to an acute point and below to the base or a short stem, flaccid; midrib distinct; veins immersed, forming two or three rows of vertical, hexagonal areolæ. *sori* sunk in a groove, a short distance from the edge. Cuba to North Brazil, 1816. *SYN. Pteropsis angustifolia*.

**T. blechnoides** (Blechnum-like). *rhiz.* creeping. *sti.* 8in. to 12in. long, firm, naked, glossy. *fronds* 1ft. to 2ft. long, 8in. to 12in. broad, simply pinnate; pinnae of barren fronds two or three on each side, 6in. to 8in. long, ½in. to 2in. broad, oblong-lanceolate, acuminate, cuneate at base, the edge thickened and wavy, the lower ones stalked; fertile pinnae narrower and more numerous. *sori* in a continuous line about midway between the edge and midrib. Malacca and Philippines.

**T. b. interrupta** (interrupted). *fronds*, pinnae smaller than in the type. *sori* interrupted and much nearer the edge.

**T. furcata** (forked). *rhiz.* somewhat creeping, densely tomentose. *fronds* 6in. to 18in. long, once or twice dichotomously forked or sub-pinnatifid; lobes linear, erect-patent, much acuminate, entire, 4in. to 8in. long, ½in. to ¾in. broad, coriaceous, minutely scaly below. *sori* sub-marginal, continuous or interrupted. West Indies, &c., 1824. *SYNS. Cuspidaria furcata, Pteropsis furcata*.

**T. lanceolata** (lance-shaped). *rhiz.* creeping, very stout. *sti.* ½in. to 2in. long, firm, erect. *fronds* 6in. to 12in. long, ½in. to 2in. broad, gradually narrowed from the centre to both ends, the edge entire but often crisped, firm, coriaceous, with a distinct midrib; areolæ immersed. *sori* in continuous or interrupted lines near the edge of the contracted upper third or quarter of the frond. West Indies and Guatemala, 1818. *SYNS. Neurodium lanceolatum, Paltonium lanceolatum*.

**TETSIA.** A synonym of *Cordylina*.

**TAGETES** (a name of mythological derivation, from *Tagus*, one of the Etruscan deities). **Marigold.** **ORD. Compositæ.** A genus comprising about a score species of mostly hardy, erect and branched or diffuse, annual herbs, natives of the warmer parts of America. Flower-heads yellow or orange, long-pedunculate or densely corymbose; ray florets one-seriate, solitary, or rarely deficient; disk hermaphrodite; involucre bracts one-seriate; receptacle

**Tagetes**—continued.

flat, often small; achenes linear, glabrous or pilose. Leaves opposite, pinnately dissected or rarely undivided and serrulated. The best-known species are here described. For culture, and further remarks respecting *T. erecta* and *T. patula*, see **Marigold**.

**T. corymbosa** (corymbose) A synonym of *T. patula*.



FIG. 2. FLOWERING BRANCHLET OF TAGETES ERECTA.

**T. erecta** (erect). \* African Marigold. *f.* heads citron-yellow, twice the size of those of the French Marigold; involucre sub-angular; peduncles one-headed, thickened at the apex. July.



FIG. 3. FLOWERING BRANCH OF TAGETES PATULA.

**Tagetes**—continued.

*l.* pinnatisect; segments lanceolate, serrulated; serratures, especially those of the upper leaves, aristate. Stems and branches erect. *h.* 2ft. Mexico, 1596. See Fig. 2.

**T. florida** (flowery). A synonym of *T. lucida*.

**T. glandulifera** (gland-bearing). *fl.* heads pale yellow, fascicled-corymbose; involucre cylindrical. October. *l.* alternate, pinnatisect; segments thirteen to seventeen, linear-sub-lanceolate, acuminate at each end,  $\frac{1}{4}$  in. or more long. Stems and branches erect, the latter short. *h.* 4ft. South America, 1826.

**T. lucida** (shining). Sweet-scented Mexican Marigold. *fl.* heads yellow; involucre cylindrical. August. *l.* lanceolate, argutely serrated, aristate-serrated at base. Stems erect, scarcely branched. *h.* 1ft. Mexico and South America, 1798. Half-hardy. (A. B. R. 359; B. M. 740.) This species varies in having the lower leaves obtuse, and the upper ones acute and narrower. SYN. *T. florida* (S. B. F. G. ser. ii. 35).

**T. patula** (spreading).\* French Marigold. *fl.* heads fuscos-golden or fulvous; involucre smooth; peduncles elongated, one-headed, nearly cylindrical. August. *l.* pinnatisect; segments linear-lanceolate, serrated; serratures, especially the upper ones, aristate. Stems erect; branches spreading. *h.* 1ft. Mexico, 1573. See Fig. 3. (B. M. 150.) SYN. *T. corymbosa* (B. M. 3830; S. B. F. G. 151).

**T. signata** (distinct). Striped Mexican Marigold. *fl.* heads yellow; involucre oblong-ovate, five-angled; peduncles one-headed, scarcely thickened above. Summer. *l.* pinnatisect, segments six pairs, oblong-lanceolate, incised-serrated, the lower serratures aristate. Stems erect, branched. *h.*  $\frac{1}{4}$ ft. Mexico.

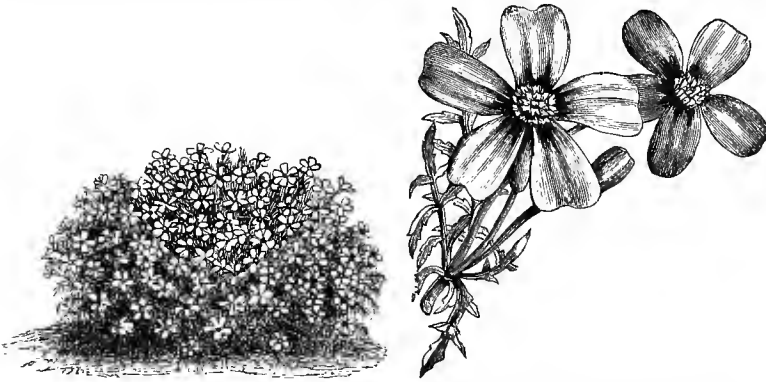


FIG. 4. TAGETES SIGNATA PUMILA, showing Habit and detached Portion of Inflorescence.

**T. s. pumila** (dwarf). This is of dwarfer, more compact habit than the type. See Fig. 4. (R. H. 1863, p. 11.)

**T. tenuifolia** (slender-leaved).\* *fl.* heads yellow, unspotted; ray florets ample, nearly round; involucre obovate, smooth, shorter than the disk; achenes black. August. *l.* opposite or alternate, pinnatisect; segments thirteen to seventeen, linear, serrated, the serratures of the upper leaves aristate. *h.* 2ft. Mexico and Peru, 1797. Plant erect, slightly branched. (B. M. 2045; S. F. G. 141.)

**TAIL-FLOWER.** A common name for *Anthurium*.

**TAILS.** The long, feathery or hairy terminations of certain fruits.

**TAINIA** (from *tainia*, a band or fillet; in allusion to the shape of the lip). SYNS. *Ania*, *Mitopetalum*. ORD. *Orchideæ*. A small genus (six or seven species) of stove orchids, natives of the East Indies, South China, and the Malayan Archipelago. Flowers pedicellate, scattered, rather large or mediocre; sepals and petals narrow, slightly acute or long-acuminate; lip erect; column rather long; pollen masses eight; scape florid, tall, leafless, few-sheathed at base; raceme terminal, simple. Stems at length thickened into pseudo-bulbs. Only two species call for mention here. For culture, see *Calanthe*.

**T. bicornis** (two-horned). *fl.*, sepals and petals green, with a reddish tinge; lip yellow, blotched with red, the middle lobe emarginate, apiculate, not spurred, having two lamellæ at base; anthers two-horned. March. *l.* oblong-lanceolate, fleshy, shorter than the scape. Ceylon, about 1842. SYN. *Ania bicornis* (B. R. xxx. 8).

**T. latifolia** (broad-leaved). *fl.* green and brown; petals slightly spreading; lip unguiculate, produced with the column in a connate, trilobed sac, the lateral lobes obtuse, the middle one acute, shorter; scape 2ft. long. *l.* oblong, plicate, shorter than the scape. Sylhet, 1852. SYN. *Calanthe viridi-fusca* (B. M. 4669).

**TALAUMA** (the vernacular name of the South American species). ORD. *Magnoliaceæ*. A genus embracing about fifteen species of mostly stove, evergreen trees; three or four are natives of tropical America, and the rest inhabit tropical Asia and Japan. Flowers and leaves as in *Magnolia*; but the fruit differs in the fusion of its constituent carpels, and in the irregularly circular mode of splitting. The under-mentioned species are well worth cultivating on account of their beautiful and fragrant flowers. A compost of loam, peat, and sand is most suitable. Propagation may be effected by layers, or by inarching on some of the stronger-growing *Magnolias*. Ripened cuttings, with the leaves intact, will sometimes root if inserted in a pot of sand, under a glass, in heat.

**T. Candollii** (De Candolle's). *fl.* cream-coloured, large; petals nine to twelve, the outer one short; peduncles one-flowered, rather drooping, and, as well as the petioles of the younger leaves, clothed with rufous hairs. June and July. *l.* oblong, acuminate at both ends. *h.* 6ft. Java, 1828. (B. M. 4251; B. R. 1709.)

**T. C. Galeottiana** (Galeotti's). *fl.* dull yellow,  $\frac{3}{4}$  in. in diameter; sepals and petals narrower than in the type. *l.*  $\frac{1}{4}$  in. to  $\frac{7}{8}$  in. long, narrowly elliptic-lanceolate. (B. M. 6614.)

**T. Hodgsoni** (Hodgson's). *fl.* creamy-white, large, terminal, solitary; sepals reddish-tinted outside, thick; petals six, the inner ones smaller. Winter and spring. *fr.* large; carpels sub-tetragonal, argutely beaked. *l.* ample, obovate-oblong, coriaceous, glabrous, the margins slightly sinuated. Himalayas. A medium-sized tree. (I. H. 1857, 141.)

**T. Plumieri** (Plumier's). *fl.* white, large, terminal, solitary; petals ten to twelve. All the year. *l.* oval-oblong, glabrous,  $\frac{6}{8}$  in. long, varying in breadth from  $\frac{3}{8}$  in. to  $\frac{1}{2}$  in., coriaceous. *h.* 12ft. West Indies, 1829.

**T. pumila** (dwarf).\* *fl.* cream-coloured, drooping, very fragrant at night; petals six to nine. All the year. *l.* elliptic, acuminate at both ends, smooth, reticulate-veined. *h.* 2ft. to 4ft. Amboyna and Java, 1786. The correct name of this plant is *Magnolia pumila* (A. B. R. 226; B. M. 977; L. B. C. 1555).

**TALEA.** A cutting; a small branch used for propagation.

**TALEWORT.** An old name for Borage (*Borago officinalis*).

**TALIERA.** A synonym of *Corypha* (which see).

**TALIGALEA** (said to be the native name in Guiana). *Amasonia* is now the correct name of this genus. ORD. *Verbenaceæ*. A genus comprising six species (which may be reduced to four) of stove sub-shrubs, natives of tropical America. Flowers yellow or sulphur-coloured, racemose or panicle; calyx coloured, loosely campanulate, membranous, five-cleft; corolla tube elongated, straight or incurved at base, the limb five-cleft, sub-bilabiate, with short, spreading or reflexed lobes. Leaves alternate, toothed or rarely entire; upper ones few, small. For culture of the only species introduced, see *Clerodendron*.

**T. punicea** (reddish-brown). *fl.* pale sulphur-yellow, with large, bright red bracts; racemes nodding, clothed with red-purple hairs. May and June. *l.* slender,  $\frac{6}{8}$  in. to 12 in. long, oblong- or elliptic-lanceolate, shortly acuminate, unequally toothed. Stem erect, simple or slightly branched. *h.* 2ft. to 3ft. Brazil, 1884. The correct name of this plant is *Amasonia calycina*. (B. M. 6915.) SYN. *Amasonia punicea* (Gn. xxvii. 130; R. G. 1886, 337).

**TALINUM** (said to be the name given to the plant by the negroes of Senegal, who eat it as a salad; but it may have been invented by Adanson). ORD. *Portulacæ*. A genus comprising about eleven species of stove, greenhouse, or hardy, fleshy, highly glabrous, sometimes suffrutescent herbs, inhabiting tropical and warm regions: two are African and Asiatic, and the rest American. Flowers disposed in terminal panicles, cymes, or racemes, rarely solitary, axillary or lateral;

**Talinum**—continued.

sepals two, deciduous or rarely sub-persistent; petals five, hypogynous, ephemeral; stamens five or numerous. Leaves alternate or nearly opposite, flat; stipules wanting. The best-known species are here described. They are pretty succulents, and will thrive in any light soil, but they prefer sandy peat. Cuttings are a ready means of increase for the shrubby species. *T. reflexum* may be multiplied by seeds.



FIG. 5. UPPER PORTION OF PLANT, AND PORTION OF DETACHED INFLORESCENCE, OF *TALINUM TERETIFOLIUM*.

**T. Arnotii** (Arnot's). \* *f.* pale golden-yellow, lin. in diameter; petals obovate, acute; peduncles axillary, one-flowered, longer than the leaves, spreading, with a small bract above the middle. Summer. *l.* attenuated, almost sessile,  $1\frac{1}{2}$  in. long and nearly as broad, orbicular-oblong, rounded at both ends, apiculate at the tip, fleshy, the margins quite entire. Branches 1 ft. long, succulent. Trunk or rootstalk cylindric, woody, 6 in. to 8 in. long. South Africa, 1867. Greenhouse sub-shrub. (B. M. 6220.)

**Talinum**—continued.

**T. cuneifolium** (wedge-shape-leaved). *f.* of a reddish-violet colour, disposed in a terminal panicle; lower peduncles three-flowered. July and August. *l.* flat, wedge-shaped, obtuse, mucronate. Stem erect,  $1\frac{1}{2}$  ft. high. India, Arabia, and Africa, 1820. Greenhouse sub-shrub.

**T. patens** (spreading). Puchero. *f.* carmine; petals obovate,  $\frac{1}{2}$  in. long; stamens fifteen to twenty; panicle terminal, elongated, leafless, bearing dichotomous cymes. August to October. *l.* mostly opposite, oval, abruptly tapering towards the petiole-form base. Stem erect, almost simple, 1 ft. to 2 ft. high. West Indies, 1776. Stove sub-shrub. (A. B. R. 253.)

**T. reflexum** (reflexed). *f.* yellow, in a terminal panicle; peduncles usually opposite, dichotomous, bractless. August to October. *l.* flat, lanceolate or oval, obtuse, usually opposite. Stem erect, 1 ft. high. South America, 1800. Stove biennial. (B. M. 1543.)

**T. teretifolium** (terete-leaved). Fame Flower. *f.* pink,  $\frac{3}{4}$  in. broad; stamens fifteen to twenty; peduncle  $\frac{3}{4}$  in. to 6 in. long, naked, bearing an open cyme. June to August. *l.* linear, cylindrical. Leafy stems low, tuberous at the base. North America, 1823. Greenhouse perennial. See Fig. 5. (B. R. xxix. 1; L. B. C. 819.)

**T. triangulare** (triangular). *f.* red or white, arranged in terminal, corymbose cymes; petals rounded,  $\frac{1}{2}$  in. long; stamens about thirty. August and September. *l.* alternate, obovate-lanceolate, tapering towards the sub-sessile base. Stem simple, about 2 ft. high. West Indies, 1739. Stove sub-shrub.

**T. t. crassifolium** (thick-leaved). *l.* usually broader, often emarginate and mucronate. Stem higher and branched.

**TALIPOT PALM.** A common name for *Corypha umbraculifera* (which see).

**TALISIA** (said to be the native name of some members of the genus in Guiana). SYN. *Comatoglossum*. ORD. *Sapindaceæ*. A genus including about eighteen species of stove, ever-green trees, inhabiting Brazil, New Grenada, and Guiana. Flowers mediocore or small, in branched panicles; sepals erect, biseriate; petals five, rarely more, unguiculate, the margins villous; stamens eight, rarely five or seven. Leaves alternate, exstipulate, abruptly pinnate; leaflets alternate and opposite, coriaceous, oblong, acuminate, entire. *T. guianensis*, the only species introduced, thrives in a compost of turfy loam and peat. Large cuttings, with the leaves intact, will root in sand, under a glass, in moist heat.

**T. guianensis** (Guiana). *f.* rose-coloured, disposed in decompound racemes; calyx shorter than the petals. June. *l.* leaflets many pairs, ovate-lanceolate, acuminate, coriaceous, quite smooth on both surfaces. *h.* 4 ft. Guiana and Cayenne, 1824. (A. G. 136.)

**TALLIES.** Another name for labels made of wood, cast iron, porcelain, and other substances, for permanently attaching to plants or trees. See **Labels**.

**TALLOW SHRUB.** A common name for *Myrica cerifera* (which see).

**TALLOW-TREE, CHINESE.** A common name for *Stillingia sebifera*.

**TALLOW-TREE, SIERRA LEONE.** A common name for *Pentadesma butyracea* (which see).

**TALPA EUROPEA.** See **Mole**.

**TAMARIND-TREE.** See *Tamarindus indica*.

**TAMARINDUS** (from the Arabio, *tamr*, a ripe date, and *Hind*, India; literally, Indian Date). ORD. *Leguminosæ*. A monotypic genus. The species is a large, stove, unarmed tree. Its medicinal virtues, as far as the fruits are concerned, are well known. The bark, wood, leaves, and flowers are all economically valuable. A compost of fibrous loam and sand is most suited to the requirements of *T. indica*. Seeds, which are annually imported from the East and West Indies, should be sown on a hotbed, and the young plants, when about 3in. high, inserted singly in pots. Cuttings also root readily in sand, under a glass, in heat.

**T. indica** (Indian). Tamarind-tree. *fl.* few together in copious, lax racemes at the ends of the branchlets; petals yellow, striped with red, less than  $\frac{1}{2}$ in. long, only the three upper ones developed; pedicels articulated at the base of the calyx. June and July. *fr.*, pods 3in. to 6in. by lin. or more, three to ten-seeded, ligulate. *l.* abruptly pinnate, with twenty to forty close, opposite, oblong, obtuse, glabrescent leaflets. *h.* 40ft. to 60ft. Tropics (probably indigenous in Africa), 1633. (B. F. S. 184; B. M. Pl. 92). SYNS. *T. occidentalis*, *T. officinalis* (B. M. 4563). The West Indian pods are generally shorter than those grown in the East Indies.

**T. occidentalis** (Western). A synonym of *T. indica*.

**T. officinalis** (official). A synonym of *T. indica*.

**TAMARISCINEÆ.** A natural order of shrubs, sub-shrubs, and rarely trees or durable herbs, found mostly in the temperate and warmer regions of the Northern hemisphere, and also in South Africa. Flowers often white or pink, regular, often hermaphrodite, fleshy, small or showy, variously disposed; sepals three, rarely four, free or connate at base, closely imbricated; petals five, rarely four, inserted under the disk, imbricated, free, or the base cohering in a tube; disk hypogynous or loosely perigynous, ten-glandular, crenate or angular, rarely obsolete; stamens five or numerous, inserted on the disk, free or variously connate at base; anthers two-celled; ovary free. Capsule dehiscent, coriaceous. Leaves alternate, small, sometimes scale-like, entire and often fleshy or impressed-dotted; stipules none. *Tamariscineæ* contain tannin, resin, and a volatile oil, which render them bitter and astringent. The order embraces five genera—*Fouquieria*, *Hololachne*, *Myricaria*, *Reaumuria*, and *Tamarix*—and scarcely forty species.

**TAMARISK.** See *Tamarix*.

**TAMARIX** (the old Latin name used by Pliny). Tamarisk. ORD. *Tamariscineæ*. A genus comprising about twenty species of very elegant, greenhouse or hardy bushes or small trees, distributed where the order extends. Flowers white or pink; sepals four or five, rarely six, free; petals inserted under the disk, free or lightly connate at base; stamens four, five, eight, or ten; anthers apiculate; disk more or less lobed; inflorescence of lateral or terminal spikes or dense racemes. Leaves minute, scale-like, amplexicaul or sheathing. The manna of Mount Sinai, which consists wholly of mucilaginous sugar, is produced by a variety of *T. gallica*. Sandy loam is most suitable to the culture of the greenhouse sorts. *T. gallica* will thrive under almost any conditions, and is admirably suited for ornamenting shrubberies; it is also invaluable as a seaside plant, and is very extensively employed along the South Coast. Propagation may be readily effected by cuttings, inserted in sand, under a bell glass, the greenhouse kinds in heat.

**T. africana** (African). A synonym of *T. parviflora*.

**T. articulata** (jointed). *fl.* pink,  $\frac{1}{2}$ in. in diameter, sub-sessile; spikes slender, more or less interrupted, usually sessile. July. *l.* reduced to a very short sheath, with a minute tooth. Branches fastigate, elongated, slender, cylindric, jointed. *h.* 10ft. to 25ft. India. A greenhouse bush or coniferous-looking tree. SYN. *T. orientalis*.

**T. dioica** (dioecious). *fl.* pink,  $\frac{1}{2}$ in. in diameter, dioecious; spikes dense, panicled,  $\frac{1}{2}$ in. to 2in. long, about equalling their peduncles. June. *l.* sheathing, glabrous, green, obliquely truncate and acuminate. Branches with drooping extremities; ultimate

**Tamarix**—continued.

branchlets elongated, spreading-fastigate. *h.* 6ft. India, 1823. A small, greenhouse tree.

**T. gallica** (French).\* Common Tamarisk. *fl.* white or pink, in catkin-like, obtuse spikes  $\frac{1}{2}$ in. long; disk acutely five-angled. July to September. *l.* on the branchlets extremely minute, closely imbricated, triangular, auricled, keeled; those on the older wood  $\frac{1}{2}$ in. long, subulate. Branchlets excessively slender and feathery. *h.* 5ft. to 10ft. India to Europe. Hardy shrub or small tree.

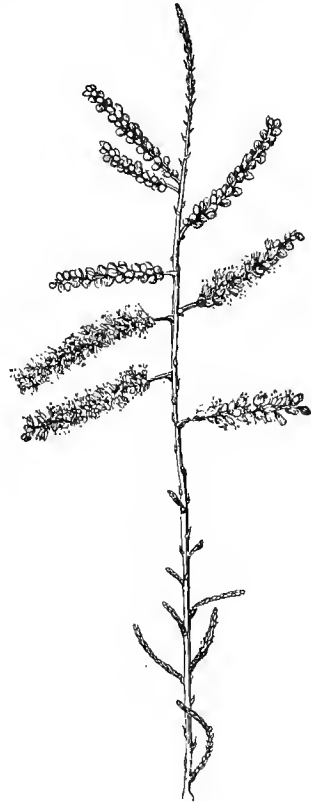


FIG. 6. FLOWERING BRANCH OF TAMARIX GALLICA INDICA.

**T. g. indica** (Indian). *fl.*, lobes of the disk entire or nearly so. *l.* semi-amplexicaul. Branchlets divaricate. Greenhouse. See Fig. 6.

**T. g. Pallasii** (Pallas'). *fl.* rosy-pink; lobes of disk deeply emarginate. *l.* shortly decurrent. Branchlets erect. Thibet, &c.

**T. orientalis** (Eastern). A synonym of *T. articulata*.

**T. parviflora** (small-flowered).\* *fl.* pink, small; spikes or racemes lateral, crowded, nine to ten lines long. Summer. *l.* small, lanceolate, subulate, a little keeled, acute. South-eastern Europe, Levant. Hardy shrub. (F. d. S. 898.) SYNS. *T. africana*, *T. tetrandra*, of gardens (R. H. 1855, 401).

**T. tetrandra** (four-anthered). *fl.* white; racemes lateral, nearly  $\frac{1}{2}$ in. long. July. *l.* lanceolate, amplexicaul; adult ones diaphanous at apex. *h.* 6ft. to 8ft. Caucasus, 1821. Hardy shrub.

**T. tetrandra** (four-anthered), of gardens. A synonym of *T. parviflora*.

**TAMNUS.** A synonym of *Tamus* (which see).

**TAMONEA** (from *Tamone*, the name of the genus in Guiana). SYNS. *Ghinia*, *Ischnia*, *Kempferia*, *Leptocarpus*. ORD. *Verbenaceæ*. A small genus (four species) of erect, stove herbs or sub-shrubs, natives of tropical America. Flowers small, few in a spike; corolla limb spreading, five-cleft. Leaves opposite, small, sub-sessile. *T. spicata* and *T. verbenacea* have been introduced, but are now probably lost to cultivation.

**TAMONEA** (of Aublet). Included under **Miconia** (which see).

**TAMUS** (the old Latin name used by Pliny). **SYN.** *Tamnus*. **ORD.** *Dioscoreaceæ*. A small genus (two species) of greenhouse or hardy, tuberous-rooted twiners; one is a native of the Canary Islands, and the other is broadly dispersed over Europe, North Africa, and temperate Asia. Flowers diceious; racemes axillary; males often elongated, loose, the flowers disposed in small, few-flowered racemes, or solitary and pedicellate at the sides of the rachis; females very short, few-flowered, sometimes reduced to a sessile fascicle. Berry sub-globose, succulent, indehiscent. Leaves alternate, cordate, entire or three-lobed. *T. communis* is the only species calling for description here. It thrives in any ordinary soil, and may be increased by divisions of the root; or by seeds, raised in a cold frame.

**T. communis** (common). Black Bryony; Lady's Seal; Murrain Berries, &c. *fl.*  $\frac{1}{2}$  in. in diameter; female racemes lin. shorter than the males, recurved, few-flowered. May and June. *fr.* red, oblong,  $\frac{1}{2}$  in. long. *l.* ovate-cordate, acuminate, 2 in. to 3 in. long, on long petioles, obscurely laterally lobed, five to seven-nerved, the tips bristly; stipules reflexed. Stem many feet long, angular, branched. Rootstock ovoid, black, fleshy. Europe (Britain), &c. (*Sy. En. B.* 1508.)

**TAN**, or **TANNERS' WASTE**. This consists of the bark of various trees, chiefly the Oak, Larch, and Willow. The tannin is extracted for the purpose of tanning leather, and a large quantity of refuse remains to be disposed of. This refuse is frequently employed for making hotheds, as it gives a steady heat for a considerable time, the heat being more easily regulated, and retained longer, than that obtained from pure stable-yard manure. In general, however, a mixture of manure and dead leaves is preferred to Tan, as, when it has lost its heat, and has to be replaced in the hothed, this mixture forms a valuable manure for the soil; while Tanners' Waste decays slowly, and is of little value as manure. Analysis shows that the nitrogenous matters of the fresh bark are almost entirely removed from it in the processes of extracting the tannin; while some of the tannin remains, and hinders decay of the refuse. Nearly half the weight of the Tan is water; and the ash, or mineral compounds in the Tan, consists very largely of Carbonate of Lime, and of Silica; the valuable Phosphates and Potash salts being present in it only in very small quantity. If employed as manure, Tan should be made up into a compost with earth, lime, and farmyard manure, and the whole should be saturated occasionally with liquid manure, and allowed to ferment for a considerable time before it is used.

**TANACETUM** (said to be an altered form of *Athanasia*, from *athanatos*, immortal; in allusion to the persistent flowers). *Tanay*. **ORD.** *Compositæ*. A genus embracing about thirty species of mostly hardy, erect, often odorless, annual or perennial herbs, often suffrutescent at base, natives of Europe, North Africa, Central and Northern Asia, and North America. Flower-heads yellow, small or mediocre, corymbose, or rarely solitary and long-pedunculate, disk-formed; involucre hemispherical or campanulate, rarely ovoid, the bracts many-seriate; receptacle flat or slightly convex, naked; achenes and florets often glandular. Leaves alternate, variously dissected, or rarely entire and toothed. The species are not possessed of much beauty. Those here described are perennials, thriving in ordinary soil. Propagated by divisions.

**T. Balsamita** (Balsamita). Costmary. *fl.* heads yellow, in branched corymbs; ray very small or absent. Autumn. *l.* elliptic, obtuse, minutely and regularly crenate-dentate, the radical ones stalked, often sub-cordate. *h.* 2 ft. to 3 ft. Orient (naturalised in several European countries). **SYN.** *Balsamita vulgaris*.

**T. elegans** (elegant). A synonym of *T. huronense*.

**T. huronense** (Lake Huron). *fl.* heads golden-yellow, twin or sub-corymbose; involucre campanulate; florets thickened at base and apex. Summer. *l.* bipinnate; lobes short, rounded, entire

**Tanacetum**—continued.

or three-lobed, the margins revolute. Stem erect, branched, and (as well as the young leaves) silvery-velvety. *h.* 1½ ft. North America. **SYN.** *T. elegans* (F. d. S. 1191).

**T. leucophyllum** (white-leaved).\* *fl.* heads golden-yellow, corymbose; involucre hemispherical, with imbricated bracts; florets slightly exceeding the involucre; peduncles solitary in the axils of the upper leaves. Summer. *l.* sessile or shortly petiolate, roundish-ovate; lower ones bipinnatisect; upper ones pinnatisect. Stems ascending. *h.* 9 in. Turkestan. Plant silvery-silky. (*R. G.* 1064.)

**T. vulgare** (common). Buttons; Common Taney. *fl.* heads many,  $\frac{1}{2}$  in. in diameter, corymbose; peduncle stout. August and September. *l.* 2 in. to 5 in. long, once or twice pinnatifid, oblong, glandular-dotted; upper ones half-amplexicaul; lower ones petiolate. Stem 2 ft. to 3 ft. high, grooved and angled, leafy. Europe (Britain), &c. (F. D. v. 871; *Sy. En. B.* 716.) A variety with curled leaves is cultivated as an ornamental plant for garnishing dishes.

**TANGHIN**. See **Tanghinia**.

**TANGHINIA** (*Tanghin* is the native name of the plant in Madagascar). **ORD.** *Apocynaceæ*. A monotypic genus. The species is a small, glabrous, stove, evergreen tree, included, by Benthams and Hooker, under *Cerbera*. Its fruit is known as the Ordeal Nut of Madagascar. For culture, see *Cerbera*.

**T. venenifera** (poison-bearing). Ordeal-tree. *fl.* in large, terminal cymes, each supported by a couple of bracts; corolla salver-shaped, with rose-coloured lobes and a green, funnel-shaped tube, which is hairy within. May. *fr.* purplish, tinged with green, ellipsoid, 2 in. to 3 in. long, containing a hard stone. *l.* smooth, alternate, lanceolate, rather thick, about 6 in. long, clustered towards the points of the branches and directed upwards. *h.* 20 ft. Madagascar, 1826. (B. M. 2698, under name of *Cerbera Tanghin*.) The seeds of this plant furnish a powerful poison, and were formerly largely used as an ordeal by the kings of Madagascar. For a full and very interesting historical account, see Mr. Telfair's letter published in the "Botanical Magazine" at the figure quoted.

**TANK**. A cistern or reservoir, which, on a large or small scale, is invaluable in every garden for collecting and preserving water until required for use. Every horticultural structure should be provided with a Water-tank in some convenient position into which the rain-water that falls on the roof should be conducted, and an additional means of supply provided, if possible, to use when this fails. Tanks may be built, in any size desired, with bricks and cement, or purchased, ready for fixing, made of galvanised iron or slate.

**TANKERVILLIA**. A synonym of **Phaius** (which see).

**TANNER'S-TREE**. An old name for **Coriaria myrtifolia** and other species.

**TANSY**. See **Tanacetum vulgare**.

**TAONABO**. A synonym of **Ternstroemia** (which see).

**TAPE GRASS**. See **Vallisneria spiralis**.

**TAPEIONITES**. Included under **Sinningia** (which see).

**TAPER**. The opposite of angular. See **Terete**.

**TAPIOCA-PLANT**. A common name for **Manihot utillissima** (which see).

**TAPOGOMEA**. A synonym of **Cephaelis** (which see).

**TAP-ROOTED**. Having a large, simple, conical root, forming a centre round which the divisions are arranged.

**TAR**. Of late years, Tar has come to be regarded as a most valuable remedy against the ravages of many insects in gardens; and it is also used for the protection of farm crops. References have been made to it in treating of the remedies for insect attacks under the names of various plants; but it may be of use to give here a summary of the best methods of employing it.

As a preventive of attack, Tar is employed against such larvae as conceal themselves underground during the day, and crawl up tree-trunks at night. It is also used to prevent the ascent of the females of the Winter Moths (see **Hybernia** and **Winter Moth**), and other



VARIETIES OF SCILLA BIFOLIA.





**Tar**—continued.

female insects that cannot fly. These insects are thus prevented from reaching the leaf and flower-buds for egg-laying, and the trees are saved from destruction by the larvæ. The Tar may be applied directly on the bark, in a broad ring, mixed with an equal bulk of cart-grease, or with one-third part of fish-oil; the latter being added to prevent the Tar from losing its stickiness in frosty weather. On warm days, this mixture becomes fluid, and sinks into the bark; and trees with thin bark are liable to be injured by it. This difficulty may be overcome by placing a belt of straw-rope, or cloth, or strong paper, round the trunks that might be injured, and putting the Tar on the belt.

Tar-water and Spirits of Tar are also used as preventives; sand, well saturated with them, being laid round the base of each stem, to prevent the passage of insects to the plant. Tar-water is sometimes syringed over plants, as, in weak solutions, it is a good insecticide, and, by its smell, also deters insects from laying eggs on plants so treated.

Tar has been employed with great success for the capture of such insects as the beetles that devour Raspberries (see remarks on INSECTS under **Raspberry**), Turnips, and other plants, and also against such insects as Frog-hoppers. In America, it has proved itself the most effectual means of capturing the notorious Rocky Mountain Locusts. A light framework of wood is covered with thin wooden boards, cloth, or strong paper, so as to form a shallow tray, and the inside is smeared with Tar. The mode of using the trap varies with the insects to be caught. For catching Raspberry Beetles, and other insects on trees and bushes, the branches are beaten over the tray, and the insects fall into it, and are stuck in the Tar. Against the Turnip Flea, Grass-hoppers, &c., the same method may be employed as against the Rocky Mountain Locusts, viz., dragging the tray along the ground, with something about 12in. or 18in. in front to disturb the insects, and to cause them to leap, when many of them fall into the Tar, and are held fast in it.

**TARAXACUM** (from *tarasso*, to disturb, to alter; from its supposed effects upon the blood). Dandelion. SYN. *Leontodon* (of Adanson). Including *Lasiopus*. ORD. *Compositæ*. A genus comprising, according to Bentham and Hooker, not more than half-a-dozen species of mostly hardy, nearly stemless herbs, broadly distributed. Flower-heads yellow, homogamous; ray florets ligulate, truncate at apex, five-toothed; involucre campanulate or oblong, the inner bracts one-seriate, the outer ones shorter and many-seriate; receptacle flat; achenes glabrous; scapes leafless, one-headed, or rarely branched at apex and two or three-headed. Leaves radical, entire, toothed, sinuate, or runcinate-pinnatifid. Only two species call for mention here. They thrive in ordinary soil, and may be increased by divisions. *T. officinale* is cultivated as a salad plant. For this purpose, seeds should be sown, in March or April, in drills 1ft. apart, or in a seed-bed, with a view to transplanting afterwards. All the after-attention necessary is that of an occasional hoeing between the plants. In the following spring, a quantity of new leaves will appear, and, in order to blanch them as they grow, the plants may be buried with sand, or covered with large, inverted flower-pots. The sand should be from 4in. to 6in. deep, and when the leaves show through it, they should be cut off at the crown and the sand placed over others. The plants should, of course, never be allowed to flower and ripen seeds in a garden.

**T. montanum** (mountain). *A.*-heads one or two on a hairy scape; involucre bracts recurved and acute at apex. August. *l.* spreading, oblong, sub-runcinate, spiny-toothed, glabrous. Armenia, 1834. SYN. *Lasiopus sonchoides* (S. B. F. G. ser. ii. 346).

**T. officinale** (official). Common Dandelion. *A.*-heads ½in. to 2in. broad, the outer ray florets often brown on the back; involucre

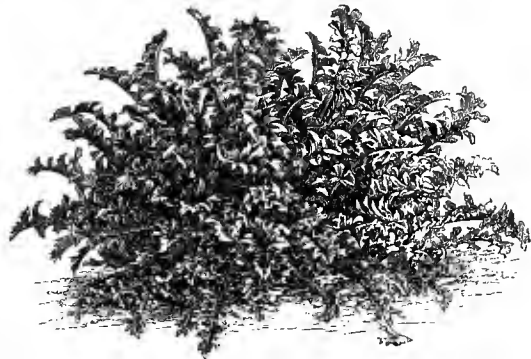
**Taraxacum**—continued.

FIG. 7. TARAXACUM OFFICINALE.

campanulate, the outer bracts recurved, the inner erect. March to October. *l.* oblong-obovate or spatulate, toothed, sinuate, or runcinate-pinnatifid. Root long, stout, black. Europe (Britain), &c. A well-known medicine. See Fig. 7. (Sy. En. B. 802.)

**TARCHONANTHUS** (from *Tarchon*, the Arabic name for *Artemisia Dracunculus*, and *anthos*, a flower; in reference to the resemblance of the flower-heads to those of *Artemisia Dracunculus*). African Fleabane. ORD. *Compositæ*. A small genus (three species) of small, greenhouse, tomentose, South African trees. Flower-heads small, sessile or shortly pedunculate, in axillary or terminal panicles; involucre of the male flowers of five scales, connate to their middle; those of the female of many separate scales, in a double row; receptacle hairy. Leaves alternate, petiolate, entire or lobed at apex, rather thick. The introduced species thrives in sandy, fibry loam, with the addition of a little leaf mould. Propagated by cuttings, inserted in sand, under a bell glass, in the beginning of summer.

**T. camphoratus** (camphor-scented). *A.*-heads purple; females composed of three to five florets; panicle terminal, many-headed. June to October. *l.* lanceolate-oblong or obovate, acute at base, sub-acute or obtuse at apex, 3in. to 5in. long, entire or denticulate; young ones densely velvety above; old ones glabrous and reticulated above, tomentose below. *h.* 6ft. 1690. (L. B. C. 382.)

**TARO.** A native name for *Colocasia antiquorum* (which see).

**TARRAGON** (*Artemisia Dracunculus*). A perennial, native of Southern Europe, cultivated for the use of its aromatic leaves in seasoning, salads, &c., and in the preparation of Tarragon vinegar. The plant succeeds best in warm, rather dry situations, and a little protection should also be afforded the roots through the winter, as during severe frost they are liable to be injured. If green leaves are required during winter, a few roots should be lifted in autumn, and placed in heat; it will need but a small quantity to maintain a succession. The foliage may also be cut and dried in autumn for use in a dry state afterwards. Tarragon may readily be propagated by division in March and April, or by cuttings struck in a little warmth when growth is commencing in spring, or later in the summer, under a hand glass placed outside. A few young plants should be raised annually to keep up a supply.

**TARTAREOUS.** Having a rough, crumbling surface.

**TASMANNIA.** Included under *Drimys*.

**TASTELESS MOUNTAIN CURRANT.** See *Ribes alpinum*.

**TAUSCHERIA** (named in honour of Ignatius Frederick Tauscher, Professor of Botany at Prague, who died in 1848). ORD. *Cruciferae*. A monotypic genus. The

**Tauscheria**—continued.

species is a small, erect, branched, hardy annual, inhabiting Central Asia and North India, and having small yellow flowers and entire leaves. It has no horticultural value.

**TAVERNIERA** (named in honour of J. B. Tavernier, 1605-89, a celebrated traveller in the Levant). ORD. *Leguminosæ*. A small genus (seven species have been described as such, but the number may be reduced to three or four) of greenhouse, caescent or glabrous undershrubs, natives of the East Indies and the Orient. Flowers pink or white, few in axillary, pedunculate racemes; calyx teeth sub-equal, or the two upper ones more remote; standard broadly orbicular, narrowed at base, scarcely clawed; bracts minute or caducons. Pods flattened, indehiscent. Leaves few, one-foliolate or pinnately trifoliolate; leaflets often obovate or orbicular; stipules scarious. Two species have been introduced. For culture, see **Desmodium**.

**T. lappacea** (Burdock-podded). *fl.* yellow, one or two together, axillary, on short pedicels. July and August. *fr.* pods beset with stiff bristles, which are hooked at the apex. *l.* trifoliolate; leaflets fleshy, obovate, villous. Stems procumbent, branched, divaricate, terete. Arabia Felix, 1820.

**T. nummularia** (Moneywort). East Indian Moneywort. *fl.* red, glabrous,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; racemes few or many-flowered, usually exceeding the leaves. June and July. *l.* shortly petiolate, usually trifoliolate; leaflets  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, obovate-oblong or nearly round, thick, thinly caescent beneath; stipules free. Branches copious. *h.* 1 ft. to 2 ft. India, Afghanistan, Orient, 1826.

**TAWNY.** See **Fulvous**.

**TAXANTHEMA.** A synonym of **Statice** (which see).

**TAXÆ.** A tribe of *Coniferae*.

**TAXODIUM** (from *Taxus*, the Yew, and *eidos*, resemblance; referring to the similarity in the leaves). Deciduous Cypress. SYNS. *Cupressinnata*, *Glyptostrobus*, *Schubertia* (of Mirbel). ORD. *Coniferae*. A small genus (three species) of ornamental, loosely-branched, hardy or half-hardy trees, natives of North America, Mexico, and China. Flowers monœcious; the males in compound, pyramidal spikes; the females two or three together near the spike of male flowers. Leaves deciduous or partly persistent, alternate, sub-spirally affixed, sometimes linear, distichous, and spreading, rarely small, appressed, scale-like. Cones hard, globose or ovoid; scales contracted and stipitate at base, woody at apex. Branchlets spreading or pendulous. The Deciduous Cypress is universally employed, throughout the United States, for making the best kind of shingles; and in Louisiana it is used for almost every other purpose to which timber can be applied. "The roots of large trees, particularly in situations subject to inundations, become covered with conical protuberances, commonly from  $1\frac{1}{2}$  ft. to 2 ft. high, and sometimes from 4 ft. to 5 ft. in thickness; they are always hollow. . . . They are made use of by the natives of the Southern States for beehives" (Loudon). In England, however, these protuberances, or "knees," are rarely produced. Perhaps the specimen showing them most perfectly is in the Syon House gardens. Being semi-aquatic, positions on the banks of rivers, and amidst marshes and swamps, are highly suitable to *T. distichum*. All the species thrive in a moist soil. Propagation may be effected by cuttings, with the leaves intact, inserted in a vessel of water, where they will root in a few weeks; by layers; or by seeds.

**T. distichum** (two-ranked)\* Bald, Black, Deciduous, or White Cypress. *fl.* males in flexible, pendulous catkins; females in very small bunches. May. *l.* in two rows, flat, rather distant, pectinate, horizontally spreading, twisting at base, linear, tapering to a sharp point,  $\frac{1}{2}$  in. long, one line broad, bright green, changing in autumn to dull red. *cones* rounded or roundish-ovate, about the size of a pigeon's egg; scales thick, dull brown. Branches stout, stiff, horizontal or ascending at the ends, the lateral ones rather pendulous; branchlets very slender, elegantly

**Taxodium**—continued.

pinnate. *h.* 120 ft. United States, 1640. The following are varieties:

**T. d. denudatum** (denuded). Branches slender, long, horizontal or drooping towards the ends, irregularly and little divided; branchlets fringed with scattered, variable, unequally-distant leaves.

**T. d. fastigiatum** (pyramidal). *l.* two-rowed, resembling those of the species. Branches short, erect, slightly spreading at the top. A very distinct-looking, conical-pyramidal, small tree.

**T. d. microphyllum** (small-leaved)\* *l.* shorter than in the type, distichous, somewhat imbricated, ovate-lanceolate. Branchlets erect, pendulous, or ascending. SYN. *Glyptostrobus pendulus* (B. M. 5603).

**T. d. nanum** (dwarf). Branches numerous, almost horizontal, short. This variety resembles the type, but is readily distinguishable by its very small dimensions, forming a very compact bush, 10 ft. to 12 ft. high.

**T. heterophyllum** (variable-leaved). Embossed Cypress. *l.* variable, alternate, some scale-formed, small, ovate, acute or obtuse, sometimes much longer, closely pressed and decurrent along the shoots, sometimes two-rowed, regularly tortuous, and almost awl-shaped, three to eight lines long. *cones* terminal, egg-shaped or oblong-cylindrical. Branches rising upwards and spreading at the summits; branchlets alternate. *h.* 8 ft. to 10 ft. China.

**T. mexicanum** (Mexican). A synonym of *T. mucronatum*.

**T. mucronatum** (mucronate-scaled). Montezuma Cypress. *l.* linear, pointed, nearly evergreen, two-rowed, straight, flat, tapering to a point, slenderer than in *T. distichum*. *cones* rather large, with the scales strongly mucronate. Branches spreading, slender. *h.* 120 ft. Mexico. This species is too tender for the English climate; it may be readily distinguished from *T. distichum* by its sub-persistent leaves. SYN. *T. mexicanum*.

**TAXUS** (the old Latin name for the Yew, used by Virgil and Pliny, akin to Greek *Taxos* of Dioscorides). Yew. SYN. *Verataxus*. ORD. *Coniferae*. A genus comprising six or eight species (probably varieties of one) of hardy, evergreen trees, rarely shrubs, broadly dispersed over North temperate regions. Flowers diœcious; males



FIG. 8. MONÆCIOUS BRANCHLET OF *TAXUS BACCATA*, showing—*m*, Clusters of Male Flowers; *f*, Fruits almost fully grown, with the arillus almost concealing the seed; *f'*, a Young Fruit, in which the arillus only half conceals the seed; *g*, Gall of Yew Gall-midge (*Cecidomyia Taxæ*), consisting of the swollen terminal bud, resembling a cone of green leaves, among which the larvæ live.

solitary in the axils, sub-sessile; female catkins axillary, sessile, one (or very rarely two?) flowered. Fruit solitary, one-seeded. Leaves sub-spirally affixed, usually distichous-spreading, very shortly petiolate, linear, flat, often falcate. "The Yew is of geological antiquity; it formed part of the forests of Britain at a period long

**Taxus**—*continued.*

anterior to historic times. It is found among the buried trees on the Norfolk coast, near Cromer. It also "crops up in another forest, now beneath the Bristol

FIG. 9. BRANCHLET, WITH FRUIT, OF *TAXUS BACCATA ADPRESSA*.

Channel, in which, if there be any truth in bones, the elephant, rhinoceros, and beaver roamed" (G. C. n. s., vi., p. 99). The wood, which is hard and compact, but

**Taxus**—*continued.*

quently tipped with galls of a Gall-midge (*Cecidomyia Taxi*). One of these is shown in Fig. 8. The female midge lays her eggs in the terminal bud of a twig; the larvæ hatch, and the result of their operations is the formation of a gall, which bears a strong resemblance to a cone in its form, and in the overlapping of the leaves of which it is composed. Among the leaves the small larvæ of the midge may be found. These galls are usually solitary; though two, or even three, may be found side by side at the tips of the twigs, the growth of which they check. They do not, however, inflict much injury on the trees. Should it be desired to get rid of the galls, they are so conspicuous that they can be readily detected and cut off. This should be done as soon as possible after their formation, while they still inclose the larvæ. Yews thrive in almost any soil. They are readily propagated from seeds, which should be sown in spring; the ripe fruits, after being gathered, should be mixed with sand and treated similarly to those of the Hawthorn until sowing time. Cuttings also afford a ready means of increasing any desirable form; these should be inserted in sandy soil, in August, and kept shaded under handlights, or in cold frames, during bright sun, until rooted. The golden varieties, and those of weeping habit, are frequently grafted on tall stems of the common upright type. Layering may also be advantageously resorted to.

**T. baccata** (berried). Common Yew. *fl.*, male catkins  $\frac{1}{2}$  in. long; females minute. *March. fr.*  $\frac{1}{2}$  in. long, rounded, with a red, mucilaginous cup. *l.* linear, more or less falcate, acute,  $\frac{1}{2}$  in. to  $1\frac{1}{2}$  in. long, coriaceous, shining above, paler beneath. Trunk 15 ft. to 50 ft. high, sometimes as much as 27 ft. in girth, channelled;

FIG. 10. *TAXUS BACCATA DOVASTONI*.

flexible and elastic, was in olden times in great request for the manufacture of bows. The branches are fre-

branches spreading. Europe (Britain), India, &c. Tree. See Fig. 8. The following varieties are enumerated by Gordon, in "The Pinetum":

**Taxus**—continued.

- T. b. adpressa** (adpressed).\* *fr.* like that of the type, but somewhat smaller. *l.* oblong or bluntly oval, rounded at both ends on the lesser branchlets, but much longer and more pointed on those of the leading shoots, more or less distichous, flat, rather distant, on very short footstalks, decurrent, mostly spiny-pointed, two to four lines long, dark glossy-green above, glaucous below. Branches numerous, much divided, horizontally spreading, sometimes in whorls; lateral ones and branchlets distichous. *h.* 6ft. to 8ft. A dense, spreading, depressed bush, raised from seed in the nursery of Messrs. Dickson, of Chester, more than half a century ago. See Fig. 9. *SYNS.* *T. tardiva*, *Cephalotaxus tardiva*. There is a form, *erecta*, of upright habit.
- T. b. argentea** (silvery). *l.* striped with silvery-white, sometimes changing to straw-colour. A very handsome variety.
- T. b. cheshuntensis** (Cheshunt). This variety is intermediate between the type and *T. b. fastigiata*.
- T. b. Dovastonii** (Dovaston's).\* Principal branches horizontal or pendent; branchlets quite drooping. A very striking variety. In the form *variegata*, all the leaves, when young, are broadly edged with golden-yellow, but, when fully matured, they change to a bright green, edged with silvery-white. See Fig. 10.
- T. b. elvastonensis** (Elvaston). *l.* on the young parts of the plant entirely of a bright orange-colour.
- T. b. epacrioides** (Epacris-like). *l.* light green, small. A pretty, dwarf, somewhat spreading variety.
- T. b. erecta** (erect).\* Fulham Yew; Upright Common Yew. A slender variety, with smaller foliage than the type, but with a much stiffer and more erect habit. *Crowderi* is a form differing very slightly from this.
- T. b. erioides** (Heath-like). *l.* dark green, very small. Twigs short, erect, slender. A slender, slow-growing variety, 1ft. to 2ft. high. *SYN.* *T. empetrifolia*.
- T. b. fastigiata** (pyramidal).\* Irish or Florence Court Yew. *fr.* oblong, *l.* in tufts, scattered along the branchlets, not two-rowed as in the type. Branches erect, closely compressed, forming a pyramidal or broom-shaped head. A very distinct and singular variety, of which the following are forms: *aurea variegata*, with golden-variegated leaves; *variegata*, having a portion of the foliage striped and margined with silvery-white or pale straw-coloured blotches.
- T. b. Foxii** (Fox's). *l.* much smaller and darker than in the type. A very dwarf kind, not exceeding 2ft. in height.
- T. b. fructu-luteo** (yellow-fruited).\* *fr.* of a beautiful golden-yellow, very handsome.
- T. b. glauca** (glaucous). *l.* dark green above, bluish or glaucous-grey on the under part. Bark on the young shoots rusty-brown. A very vigorous kind.
- T. b. Jacksoni**. Jackson's Weeping Yew. *l.* light green, broad, all more or less incurved, falcate, and thickly covering the upper part of the branches. Branchlets reddish-brown, numerous, short, obliquely placed, and more or less curved. A nice, pendulous kind.
- T. b. nana** (dwarf). *l.* longer, and of a darker and more glossy-green, than those of the type. A very desirable variety, forming a dwarf, dense, conical bush.
- T. b. nidpathensis** (Nidpath Castle). A form rather columnar than pyramidal in habit, and having a tendency to spread at the top.
- T. b. recurvata** (recurved). *l.* longer and straighter than those of the species; the margins involute. Branches long and straggling, spread out and little divided, but often reflected.
- T. b. sparsifolia** (sparse-leaved). *l.* dispersed round the branches, as in the Irish Yew. Branches spreading.
- T. b. variegata** (variegated). *l.* mostly edged with golden-yellow. A very handsome variety. *Barroni* is a fine fruit-bearing form.
- T. b. Wallichiana** (Dr. Wallich's). *l.* deep glossy-green, much paler and not glossy below. Branches long, slender, spreading, light brown; branchlets more or less pendent. Gordon accords this specific rank.
- T. brevifolia** (short-leaved). Western or Californian Yew. *fr.* resembling that of the Irish Yew. *l.* distichous, flat, narrow, acute-pointed, somewhat curved on the branchlets, but more or less scattered on the leading shoots and principal branches,  $\frac{1}{2}$  in. to 1 in. long, linear-falcate, rarely straight, glossy-yellowish-green, glaucous beneath, with a yellowish footstalk one line long. Branches slender, very long, pendulous, with yellowish bark. *h.* 30ft. to 40ft. California. A handsome tree. *SYN.* *T. Lindleyana*.
- T. canadensis** (Canadian). American Yew; Ground Hemlock. *fr.* resembling, but much smaller than, that of the common Yew. *l.* linear, crowded, rather narrow, mostly straight, somewhat distichous, revolute on the edges, decurrent at base, on very short footstalks, abruptly tapering at the apex, spiny-pointed,  $\frac{1}{2}$  in. to 1 in. long, glossy, pale yellowish-green above, slightly rusty beneath. Branches slender, horizontally spreading, seldom ascending; branchlets distichous. *h.* 3ft. to 4ft. North America, 1800. A spreading bush.

**Taxus**—continued.

- T. c. variegata** (variegated). *l.* at the ends of the young shoots whitish; those lower down more or less margined with white; mature ones as in the type.
- T. cuspidata** (abrupt-pointed).\* *l.* linear, curved upwards, alternate, stiff, scattered but somewhat distichous on the leading shoots, denser on the branchlets,  $\frac{1}{2}$  in. to 1 in. long, on rather long footstalks, broadly decurrent at base, abruptly spine-pointed, deep glossy-green above, pale yellowish-green beneath, but not glaucous. Branches numerous, spreading; branchlets rather stiff, angular. *h.* 15ft. to 20ft. Japan. A large, handsome bush.
- T. empetrifolia** (Empetrum-leaved). A synonym of *T. baccata erioides*.
- T. Fortunei** (Fortune's). A synonym of *Cephalotaxus pedunculata fastigiata*.
- T. globosa** (globular-seeded). Mexican Yew. *fr.* lateral and solitary on the under side of the branchlets. *fr.* with globular seeds. *l.* linear, slightly curved or falcate, narrow, closely placed, distichous, tapering to both ends, spiny-pointed,  $\frac{1}{2}$  in. to 1 in. long, on rather long, twisted footstalks, decurrent at base, dark glossy-green above, very much paler beneath. Branches long, spreading, much divided; branchlets more or less drooping at the points, mostly forked. Mexico. A handsome, large bush or small tree.
- T. Lindleyana** (Lindley's). A synonym of *T. brevifolia*.
- T. Makoya** (Makoy's). A synonym of *Podocarpus chinensis*.
- T. tardiva** (tardy). A synonym of *T. baccata adpressa*.

**T-BUDDING.** Another name for Shield-budding, one of the principal methods adopted for propagating by budding. For the insertion of the bud, the stock is cut in a longitudinal direction, and then again transversely at the upper extremity of the cut, somewhat in the shape of the letter T. In Inverted T-budding the transverse cut is made at the lower instead of the upper end, thus  $\perp$ , and the bud inserted from that point upwards. See **Budding**.

**TEA BERRY, or CANADA TEA.** See *Gaultheria procumbens*.

**TEA, BOTANY BAY.** See *Smilax glycyphylla*.

**TEAK-TREE, AFRICAN.** See *Oldfieldia africana*.

**TEAK-TREE, INDIAN.** See *Tectona grandis*.

**TEAK-TREE, NEW ZEALAND.** See *Vitex littoralis*.

**TEA, PARAGUAY.** See *Ilex paraguariensis*.

**TEA-PLANT.** See *Camellia theifera*. The name is also applied to many other plants.

**TEASEL, TEAZEL, or TEAZLE.** See *Dipsacus*.

**TEATED.** Resembling the figure of an animal's teat.

**TECOMA** (an abridgment of the Mexican name, *Tecomacochitl*). Trumpet Creeper; Trumpet Flower. Including *Campsidium* and *Pandorea*. *ORD.* *Bignoniaceae*. A genus embracing about two dozen species of stove, greenhouse, or hardy, erect or arborescent, twining, climbing, or radicans shrubs, dispersed over the warmer and sub-temperate regions of the globe. Flowers often fulvous, red, or orange, racemose or panicle at the tips of the branches; calyx tubular-campanulate, sub-equally five-toothed; corolla tube elongated, straight or incurved, sometimes slightly enlarged or sub-ventricose, sometimes dilated in an ample, campanulate throat; limb sub-bilabiate, the five lobes scarcely unequal, broad, erectopate or widely spreading; stamens four, didynamous, affixed below the middle of the tube, included or exerted. Capsule linear or narrowly elliptic, often acute at both ends, straight or incurved. Leaves opposite or rarely scattered, pinnate or undivided; leaflets often toothed. Tecomas succeed best in well-drained, loamy soil; they require very liberal supplies of water during summer, but should be kept moderately dry at the roots in winter. The plants grow vigorously under ordinary treatment; but, in order to insure their free flowering, the wood must be thoroughly ripened by being exposed to sunlight



**Tecoma**—continued.

and air during the period of growth. The stove species may be grown in heat all the summer, and ripened by being kept cooler in autumn. Those succeeding in a greenhouse may have plenty of light and air through the summer. *T. radicans*, when planted out of doors, should be trained to a wall with a south aspect. Propagation is effected by root-cuttings, by cuttings of the young or partially-ripened shoots, or by layering. A selection of the best-known species is given below. Several others, formerly included here, will be found under **Tabebuia**.

**T. australis** (Southern)\* Wonga-Wonga Vine. *fl.* in loose, terminal panicles; corolla yellowish-white, tinged inside with purple or red, the tube  $\frac{1}{2}$  in. long, the lobes broad, not one-third as long as the tube. June. *l.* leaflets usually five to nine, ovate-oblong to almost linear, entire or here and there coarsely crenate, variable,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. Australia, 1793. A tall, woody, half-hardy climber. (B. 8.) **SYNS.** *T. diversifolia*, *Bignonia Pandorea* (A. B. R. 86; B. M. 865).

**T. austro-caledonica** (South Caledonian). *fl.* small; cymes opposite, compound; panicles terminal. Summer. *l.* imparipinnate, two or three-jugate, the upper ones trifoliolate; leaflets very broadly elliptic, obtuse, with two to four teeth below the acumen, sometimes nearly round. New Caledonia, 1870. A graceful climber.

**T. capensis** (Cape)\* *fl.* clustered, in pedunculate racemes; corolla orange-scarlet,  $\frac{1}{2}$  in. long, incurved; stamens exserted. August. *l.* imparipinnate, four-jugate; leaflets ovate, serrated. *h.* 15ft. Cape of Good Hope, 1823. A half-hardy, glabrous climber. (B. R. 1117; L. B. C. 1672.)

**T. chrysantha** (golden-flowered). A synonym of *Tabebuia chrysantha*.

**T. diversifolia** (variable-leaved). A synonym of *T. australis*.

**T. filicifolium** (Fern-leaved)\* *l.* opposite, imparipinnate,  $\frac{1}{2}$  in. long, including the petioles, bearing considerable resemblance to the fronds of some of the small, slender, pinnate Ferns; leaflets nine to twelve pairs, small, ovate, deeply cut into two or three lobes on each side, the larger lobes being sometimes also toothed. Stem slight, woody. Fiji Islands, 1874. A very elegant, stove climber. **SYN.** *Campsidium filicifolium* (F. & P. 1874, p. 280).

FIG. 11. FLOWERING BRANCH OF *TECOMA RADICANS*.**Tecoma**—continued.

**T. fulva** (fulvous). *fl.* on bibracteate pedicels, seven to nine in a raceme; corolla fulvous outside, yellow within,  $\frac{1}{2}$  in. long. July. *l.* scattered, imparipinnate, multijugate; leaflets cuneate-ovate, sub-sessile, serrated at apex, villous when young, afterwards glabrous; petioles articulated. Branches terete, glabrous. *h.* 15ft. Peru, 1855. An erect, stove shrub. (B. M. 4896; F. d. S. 1116.)

**T. grandiflora** (large-flowered)\* *fl.* in a terminal panicle; corolla scarlet, shorter and broader than that of *T. radicans*, the tube scarcely longer than the calyx; pedicels drooping, biglandular. July. *l.* imparipinnate; leaflets three to five-jugate, ovate, acuminate, with tooth-like serratures. *h.* 30ft. Japan and China, 1800. A glabrous, greenhouse climber. **SYN.** *Bignonia grandiflora* (A. B. R. 493; B. M. 1398; F. d. S. 1124-25).

**T. jasminoides** (Jasmine-like)\* *fl.* in compact, terminal, corymbose panicles; corolla white, streaked with red in the throat, the tube above  $\frac{1}{2}$  in. long, the very broad lobes more than  $\frac{1}{2}$  in. long. August. *l.* leaflets usually five or seven, ovate and acuminate or ovate-lanceolate,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, all entire. *h.* 20ft. Australia. A glabrous, greenhouse climber. (B. M. 4004; B. R. 2002; P. M. B. vi. 199.)

**T. mirabilis** (wonderful). A garden synonym of *T. valdiviana*.

**T. mollis** (soft). *fl.* in a terminal panicle; corolla yellow or reddish. July. *l.* imparipinnate; leaflets four-jugate (in some forms, the upper leaves only one or two-jugate), oblong, acuminate, nearly entire, slightly serrated at apex, velvety on both sides. Branches compressed-terete. *h.* 6ft. Mexico, Colombia, Peru, and Chili, 1824. A softly pubescent-tomentose, erect, greenhouse shrub.

**T. radicans** (rooting)\* Common Trumpet Flower. *fl.* in terminal corymbs; corolla scarlet-red,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, the tube thrice as long as the calyx. Summer. *fr.* stipitate,  $\frac{1}{2}$  in. long. *l.* imparipinnate; leaflets four or five-jugate, ovate, acuminate, dentate-serrate, puberulous at the sides of the nerves beneath. *h.* 25ft. North America, 1640. A hardy shrub, climbing by aerial rootlets. See Fig. 11. **SYN.** *Bignonia radicans* (B. M. 485). The variety *minor* has narrower flowers of a beautiful scarlet colour.

**T. roseifolia** (Rose-leaved). *fl.* in terminal, sub-spicate racemes; corolla yellow, glabrous, funnel-shaped. July. *l.* imparipinnate; leaflets bijugate, oblong, obtuse, serrated. Branches terete, somewhat striated. *h.* 6ft. South America. An erect, stove shrub.

**T. sambucifolia** (Elder-leaved). *fl.* in a terminal panicle; corolla yellow, funnel-shaped. July. *l.* imparipinnate; leaflets two or three-jugate, oblong, acuminate, serrated. Branches slightly compressed. *h.* 6ft. Peru, 1824. A glabrous, erect, stove shrub.

**T. serratifolia** (serrate-leaved). A synonym of *Tabebuia serratifolia*.

**T. spectabilis** (showy). A synonym of *Tabebuia spectabilis*.

**T. stans** (standing). Yellow Elder. *fl.* racemose or paniculate; corolla yellow,  $\frac{1}{2}$  in. long. Summer. *l.* imparipinnate; leaflets five to eleven, lanceolate, acuminate, deeply serrated. Branches terete. *h.* 12ft. West Indies and Mexico to Peru, &c., 1730. An erect, glabrous, greenhouse shrub. (B. M. 3191.)

**T. s. apilifolia** (Apium-leaved). *l.* leaflets deeply incised, nearly pinnatifid. Mexico. Stove. **SYN.** *Bignonia incisa* (of gardens).

**T. undulata** (waved). *fl.*, corolla orange-coloured, ample, campanulate; racemes few-flowered, terminating the lateral branchlets. Summer. *l.* petiolate, simple, linear-lanceolate, obtuse, undulated, entire, often nearly alternate,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long; petioles nearly  $\frac{1}{2}$  in. long. India and Arabia. A tall, erect, glabrous, stove shrub. **SYN.** *Bignonia undulata* (S. E. B. 19).

**T. valdiviana** (Valdivian). *fl.* four to nine in simple, terminal racemes; corolla orange-coloured, villous within towards the base. Spring. *l.* imparipinnate; leaflets nine to fifteen, ovate-oblong or elliptic, often mucronate, the margins toothed or nearly entire, pale beneath. Branches angular. Chili, 1870. A climbing, stove shrub. **SYNS.** *T. mirabilis* (of gardens), *Campsidium chilense* (G. C. 1870, 1182).

**TECOPHILEA** (named after Tecophila, the daughter of Billotti, a botanist). **SYNS.** *Distrepta*, *Phyganthus*, *Peppigia*. **ORD.** *Hamodoraceæ*. A small genus (two species) of greenhouse, bulbous plants, natives of Chili. Flowers on rather long pedicels; perianth shortly and narrowly tubular above the half-inferior ovary, the lobes much longer, obovate-oblong, flat, sub-equal; scape included at base within a sheath with the leaves, otherwise leafless, one or loosely few-flowered. Leaves radical, few or solitary, spreading, linear or lanceolate, the base included in a long, scarious sheath. *T. cyaneo-crocea*, the only species yet introduced, thrives in a compost of

**Tecophilæa**—continued.

rich, sandy loam. The bulbs should be kept dry during their season of rest. Propagation may be effected either by seeds or by offsets.

**T. cyaneo-crocea** (blue-and-yellow). Chilian Crocus. *fl.*, perianth of a beautiful blue, with a whitish throat,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, the segments obovate, many-nerved; peduncles one to three, erect, simple, one-flowered, ebracteate,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long. *l.*, produced radical ones two or three, linear, acuminate, channelled, undulated,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. broad. 1872.

**T. c.-c. Regelii** (Regel's). *fl.*, perianth segments narrower than in the type,  $\frac{1}{2}$  in. long, oblong; peduncles longer. *l.* narrower, not undulated. (R. G. 718, under name of *T. cyaneo-crocea*.)

**TECTONA** (Tekka is the Malabar name of *T. grandis*). Teak. *SYN. Theca. ORD. Verbenacæ.* A small genus (three species) of very valuable, lofty, stove, Asiatic timber-trees. Flowers white or bluish, small, in dichotomous cymes, forming an ample, terminal panicle; calyx campanulate, shortly five or six-cleft. Leaves opposite or ternately whorled, ample, entire. The wood of *T. grandis* (Indian Teak-tree) is very valuable, and is largely employed in ship-building. This species has been introduced to our stoves; but, as it reaches a height of 80ft. to 150ft., it is scarcely likely to find accommodation for its development in this country.

**TEEDIA** (called after J. G. Teede, a German botanist and traveller, who died in Surinam). *SYN. Borkhausenia. ORD. Scrophularinæ.* A small, South African genus (two species) of greenhouse, glabrous or pubescent shrubs. Flowers pink, rather small; calyx deeply five-cleft; corolla tube cylindrical, the limb of five short, rounded, sub-equal, spreading lobes; stamens four, didynamous; peduncles cymosely few-flowered in the upper axils, forming a terminal, leafy thyrse. Leaves opposite, entire. The species are rather pretty subjects when in flower. A light, rich soil is most suitable. Propagation may be effected by seeds, or by cuttings.

**T. lucida** (clear). *fl.*, corolla four to five lines long; peduncles  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long, three to seven-flowered. April. *l.* ovate or ovate-lanceolate, narrowed at base and embracing the stem,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long, clear-surfaced, acute, serrulated. Branches tetragonal. *h.* 2ft. 1774. Plant glabrous. (B. R. 209.)

**T. pubescens** (downy). *fl.*, corolla  $\frac{1}{2}$  in. long. May. *l.* ovate or elliptic, often broader than those of *T. lucida*, rounded or narrowed at base, clasping the stem. *h.* 2ft. 1816. Plant rusty-pubescent or villous. (B. R. 214.)

**TEESDALIA** (named after Robert Teesdale, a Yorkshire botanist, author of "A Catalogue of Plants growing about Castle Howard"). *ORD. Cruciferae.* A genus consisting of two species of glabrous, hardy, annual herbs, with minute, white flowers, and rosulate leaves. They are natives of Western Europe, the Mediterranean region, and Asia Minor. *T. nudicaulis* (Pepper Cress) is a common British weed.

**TEETH.** Any kind of small divisions.

**TEGANIUM.** A synonym of **Nolana** (which see).

**TELANTHERA.** Included, for garden purposes, under **Alternanthera** (which see). It is kept up as a distinct genus by Bentham and Hooker.

**TELEGRAPH-PLANT.** A common name for **Desmodium gyrans** (which see).

**TELEIANATHERA.** A synonym of **Telanthera**.

**TELEKIA.** Included under **Buphthalmum**.

**TELEPHIUM** (the old Greek name used by Hippocrates for a similar plant, perhaps named after Telephus, son of Hercules, by Auge). *Orpine. ORD. Ficoideæ.* A genus embracing one (or three) species of hardy, diffuse, often perennial herbs, inhabiting the Mediterranean region. Flowers white, small, in terminal, sub-capitate cymes; sepals, petals, and stamens five each. Leaves alternate, twin, or opposite, ovate or oblong, obtuse or acute, nerveless. *T. Imperati* (Tree Orpine) has been introduced, but is not worth cultivating.

**TELFAIRIA** (so called after Charles Telfair, 1778-1833, an Irish botanist, who died in the Mauritius). *SYNS. Ampelosi-cyos, Joliffia. ORD. Cucurbitacæ.* A small genus (two species) of stove, climbing shrubs, natives of tropical Africa. Male flowers mediocre or rather large, on bracteate pedicels, racemose; calyx tube short, the lobes lanceolate, serrated or crenate; corolla pale purple, rotate, five-parted, the segments fringed with elongated tendrils; stamens three. Female flowers solitary; rudimentary stamens wanting; ovary oblong, tumid and lobed at the base, three to five-celled. Fruit large, orbicular, compressed; seeds edible. Leaflets three or five, oblong, auricled at base, repand-toothed or cut. By pressure, the seeds of *T. pedata* yield an excellent bland oil, and they are said to be, when fresh, as palatable as almonds. Telfairias produce their handsome flowers in great profusion, but require a large space to grow in, and to be frequently pruned before flowering. Sandy loam and a little peat form a desirable compost for the plants. Cuttings of the flowering shoots should be taken, and inserted in soil or sand, under a glass, in heat, where they will readily root.

**T. occidentalis** (Western). *fl.*  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. in diameter; corolla white, with a purple eye; stamens five; male racemes  $\frac{1}{2}$  in. long, six to ten-flowered. September. *fr.* yellow-green,  $\frac{1}{2}$  in. long, with ten thick wings  $\frac{1}{2}$  in. deep, and flesh of golden-yellow pulp. *l.* alternate, petiolate, pedately five-foliolate; leaflets  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long, shortly petiolulate, elliptic-ovate, obtusely acuminate, sinuate-toothed. Tendrils bifid. West Africa, 1870. (B. M. 6272.) Said to be cultivated for the seeds, which the negroes boil and eat.

**T. pedata** (pedate-leaved). *fl.*  $\frac{1}{2}$  in. or more long; calyx downy, large; corolla purplish; male racemes six to eight-flowered; peduncles  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long. July. *fr.* always green,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long, often  $\frac{1}{2}$  in. across, with ten to twelve deep furrows; seeds the size of a very large kidney bean. Zanzibar, 1825. (B. M. 2751-2.) *SYNS. Fvillæa pedata* (B. M. 2681), *Joliffia africana*.

**TELIPOGON** (from *telos*, the summit, and *pogon*, a beard; the column is bearded to its summit). *SYN. Thelypogon. ORD. Orchideæ.* A genus embracing about forty species of stove, epiphytal Orchids, natives of the Andes of Columbia and Peru: it is doubtful, however, whether many of them are specifically distinct. Flowers few at the apex of the peduncle, loosely racemose, showy; sepals sub-equal, free, much spreading, narrow; petals much broader; lip sessile, much spreading, undivided, rarely small; column very short and thick, setose or hispid; pollen masses four; peduncles pseudo-terminal, rather long, erect, simple. Leaves distichous, short, coriaceous or fleshy. Only one species calls for description here. It does best in small baskets full of peat fibre, potsherds, and sphagnum, or attached to a piece of teak, with a little fresh sphagnum wired over the base of the plant.

**T. Croesus** (Croesus). *fl.* yellow, with a dark network,  $\frac{1}{2}$  in. in diameter; sepals triangular, acuminate, aristate, three-nerved, carinate outside on the middle nerve; petals cuneate, rhomboid, obtuse-angled, five-nerved; lip very broad, flabellate, rounded, many-nerved, the base velvety. *l.* distichous. Stems narrow and thin. Columbia, 1877.

**TELLIMA** (an anagram of *Mitella*, under which this genus was formerly included). *ORD. Saxifragæ.* A genus embracing half-a-dozen species of hardy, erect, pilose or glandular, annual or perennial herbs, natives of North-west America. Flowers greenish or white, pedicellate, bracteolate, nodding; calyx tube ample, the limb five-toothed or five-cleft; petals five, rarely reddish, inserted at the mouth of the calyx, entire, trifid, or pinnatifid; stamens ten; racemes terminal, elongated, many-flowered. Leaves petiolate, roundish-cordate, lobed, toothed; stipules wanting, or adnate with the base of the petioles. *T. grandiflora*, the only species known to cultivation, is a handsome perennial. For culture, see **Mitella**.

**T. grandiflora** (large-flowered). *fl.* greenish, about  $\frac{1}{2}$  in. long and broad; petals lacinate-pinnatifid, sessile; raceme somewhat apicate. April. *l.* palmately-lobed, cut-toothed; cauline ones

**Tellima**—continued.

similar, two to four, alternate; petioles somewhat stipuliform at base. Stem stout, about 2ft. high. 1826. Plant hirsute. (B. R. 1178.)

**TELOPEA** (from *telopas*, seen at a distance; alluding to the great distance from which the crimson flowers are discernible in its native country). *SYN. Hylogyne.* *ORD. Proteaceæ.* A genus comprising two or three species of tall, greenhouse shrubs, endemic in Australia. Flowers red, showy, on twin pedicels, densely racemose; perianth slightly irregular, the tube open early on the under side, tapering and recurved under the limb, the laminae oblique, broad; racemes terminal, sub-globose or ovoid, surrounded by an involucre of imbricated, coloured bracts, the bracts within the raceme small. Follicles stipitate, oblique, recurved. Leaves alternate, entire or toothed. *T. speciosissima*, the only species yet introduced, is one of the most beautiful plants in the order to which it belongs. It requires a temperature rather warmer than that of an ordinary greenhouse; but a very moist atmosphere encourages a too vigorous growth, which is not conducive to floriferousness. Water may be applied freely in summer, but the roots should be kept nearly dry in winter. A well-drained border or bed of sandy loam is most suitable for the reception of this plant. Propagated by layering suckers during winter, in small pots, and allowing them to remain until rooted in the pots before being detached.

**T. speciosissima** (very showy). Waratah; Warratan. *fl.* crimson; perianth glabrous, about 1in. long; pedicels thick, recurved,  $\frac{1}{2}$ in. to  $\frac{3}{4}$ in. long; head or raceme dense, about  $\frac{3}{4}$ in. in diameter; involucre bracts ovate-lanceolate, the inner ones  $\frac{2}{3}$ in. to  $\frac{3}{4}$ in. long. *June.* *fr.*  $\frac{3}{4}$ in. to  $\frac{1}{2}$ in. long, containing ten to twenty seeds. *l.* cuneate-oblong or almost obovate,  $\frac{5}{8}$ in. to  $\frac{1}{2}$ in. long, mostly toothed in the upper part, tapering into rather long petioles, a few rarely quite entire. *h.* 6ft. to 8ft. 1789. (G. C. n. s., xvii., p. 677; B. M. 1128, under name of *Embortrium speciosissimum*.)

**TEMPERATURE.** A study of the ever-varying Temperatures daily experienced, and their effect on cultivated plants, forms an important part of the duties of every gardener who has under his charge anything beyond that which is of the hardest description. Temperatures, it need scarcely be remarked, often fluctuate very suddenly from what is called one extreme to the other; and, as their guidance is beyond human control, it becomes a necessity on the part of cultivators to prevent such changes, so far as possible, from injuriously affecting plants, by giving constant attention, and anticipating what is likely to ensue. The degree of intensity of heat or cold is ascertained by the expansion or contraction of the mercury or spirit in a thermometer. From knowledge gained by experience, the extreme Temperatures that a large number of plants will withstand with impunity is often known, but there are exceptional cases where other conditions are unfavourable, and plants succumb in spite of all precautions. To know the Temperature in which various exotics succeed best, and the proper degree of heat requisite for bringing them to perfection, is one of the first essentials towards success. The maintenance of an equable Temperature in forcing operations, and in the culture of fruits under glass, is of great importance, as on it depends most materially the development of fruit or flowers, as the case may be. Forcing indoors is most intimately connected with, and dependent upon, the regulation of Temperature by means of the heating apparatus and the proper use of the ventilators when necessary. To know the country to which any given plant is indigenous, or to ascertain from a reliable source the degree of hardness to which it may be subjected, is often a good guide in giving it proper treatment as regards the amount of heat required. But this is totally insufficient in dealing with the varied occupants of a large garden, and in conducting forcing operations in seasons when outside Temperatures often fluctuate very rapidly. Practical experience and unremitting attention are absolutely

**Temperature**—continued.

essential for good gardening, and, even when these are intelligently exercised in daily management, the operator finds there are many things beyond his control, sudden changes in the Temperature being amongst the most formidable.

**TEMPLES.** Architectural buildings, usually erected in extensive pleasure-grounds to form distinct, attractive features in themselves, and sometimes to afford resting-places or places of shelter. Temples found in many extensive gardens that have long been established, built of similar massive material, in proportion, to that of the mansion, are the best to imitate when this style of embellishment is desired. In any case, the material used should be of the most durable description; the shapes most generally adopted are circular, octagonal, and oblong. Occasionally, an elevated point or some position at the end of a walk will present itself, and appear to indicate the very place for a Temple, but these buildings need be, as a rule, but sparingly introduced. They are invariably expensive to erect.

**TEMPLETONIA** (named in honour of John Templeton, an Irish botanist). Including *Nematophyllum*. *ORD. Leguminosæ.* A genus embracing seven species of Australian, glabrous, greenhouse shrubs or under-shrubs, occasionally leafless. Flowers red or yellow, axillary, solitary or two or three together; two upper calyx lobes or teeth united or rarely distinct; standard orbicular or obovate, usually reflexed; wings narrow; stamens all united in a sheath open on the upper side; bracts usually very minute. Leaves (when present) alternate, simple, entire; stipules minute or spinescent. *T. retusa*, the only species introduced, is an interesting plant, thriving in a mixture of sandy loam and peat. It may be increased by young cuttings, inserted in sand, under a glass.

**T. glauca** (glaucous). A synonym of *T. retusa*.

**T. retusa** (retuse-leaved). Coral Bush. *fl.*, petals red or rarely white, 1in. to  $\frac{1}{2}$ in. long, all narrow, on short claws, and of nearly equal length; pedicels rigid, with obtuse bracteoles near the middle. March to June. *l.* broadly obovate to narrowly cuneate-oblong, less than  $\frac{1}{2}$ in. to above 1in. long, obtuse, emarginate, or minutely mucronate, nearly sessile or shortly petiolate. *h.* 3ft. or more. 1803. (B. M. 2334; B. R. 383; L. B. C. 526.) *SYN. T. glauca* (B. M. 2088; B. R. 859; L. B. C. 644).

**TENAGEIA.** Included under *Juncus*.

**TENARIS** (said to be the native name in South Africa). *ORD. Asclepiadææ.* A small genus (two species) of greenhouse, erect, slender, nearly simple, perennial herbs, natives of South Africa. Flowers pink or whitish, cymose; calyx deeply five-cleft, the lobes acute; corolla tube shortly campanulate, the lobes five, long, linear-spathulate; coronal scales ten, affixed to the new staminal tube; stamens affixed at the base of the corolla, the filaments connate in a short tube. Leaves opposite, narrow-linear. Only one of the species has been introduced. For culture, see *Ceropegia*.

**T. rostrata** (beaked). *fl.*, corolla whitish, densely covered towards the base with minute, purple dots,  $\frac{3}{4}$ in. in diameter, rotate; outer corona of five small, yellowish lobes; inner one of five pinkish segments; peduncles one (or two ?) flowered, three to five lines long. *l.* about four pairs, distant, linear, acute,  $\frac{2}{3}$ in. to  $\frac{3}{4}$ in. long,  $\frac{1}{2}$ in. broad, arched. Stem 1ft. high, slender. East tropical Africa, 1885.

**TENDANA.** A synonym of *Micromeria* (which see).

**TENDRIL.** The twisting, thread-like process by which some plants lay hold of others; e.g., the Vine.

**TENTHREDINIDÆ, or SAWFLIES.** A family of *Hymenoptera* (which see), of very great interest to gardeners, because of the damage the insects do to various cultivated trees, shrubs, and herbs. The name Sawfly refers to the most characteristic feature of the

**Tenthredinidæ—continued.**

family, viz., the existence in the female of an organ, very like a minute double saw, at the hinder end of the body. The saw is a modified ovipositor, and is made up of two blades, each of which consists of a support along the back, and of the cutting portion, or saws strictly so called, secured to it along one side. The two saws are quite like one another. In each the edge is toothed, and has cross-hairs, which are often furnished with minute teeth, and thus it combines the action of a saw with that of a file. The toothing and hairs of the saws differ in the various species of Sawflies. They are protected, when not in use, in a two-jointed sheath. Sawflies, for the most part, have moderately broad bodies, with the abdomen united to the thorax by its full width; differing in this from most *Hymenoptera*, which have the abdomen fixed to the thorax by a slender stalk. The head is always broader than long, but is not broader

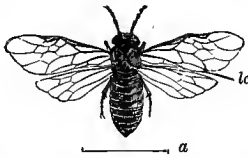


FIG. 12. *ERIOCAMPA LIMACINA*—*lc*, Lanceolate Cell in the Front Wings; *a*, Line showing the actual spread of Wings.

than the thorax. *Eriocampa limacina* (see Fig. 12) represents the majority of the group in form and general appearance. The body is usually smooth, sometimes hairy, and seldom marked with punctures. The colour is generally black or some dark shade, often with a metallic lustre; sometimes, it is coppery-green, blue, pure green, yellow, or red. The legs are often rusty-red, even when the body is some other colour; they are of fair size in proportion to the body, and have all their parts well developed. Each bears two sharp spurs near the tip of the tibia. The wings are of much the same structure as in other *Hymenoptera*; but the venation is characteristic in so far that one of the cells near the hind margin of each front wing, known as the "lanceolate cell" (*lc*, Fig. 12) is found in no other *Hymenoptera*. Generally, the wings are transparent, and more or less iridescent. The parts of the mouth are fitted for cutting vegetable structures.

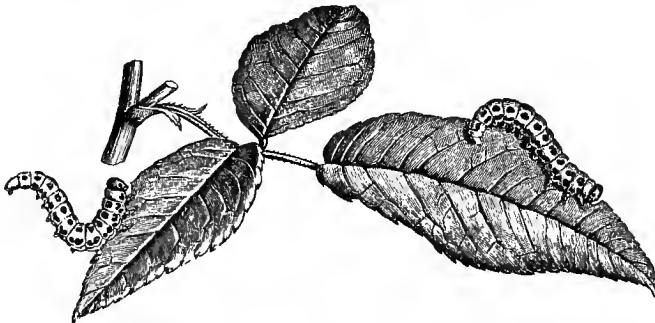


FIG. 13. LARVÆ OF ROSELEAF SAWFLY.

There is usually a little difference in aspect between the sexes, due to slight modifications of the limbs, the body, and the organs of the head.

Sawflies abound from May till the end of July; and of some species a second brood appears in autumn. The mature insects are of sluggish habits, and, in dull weather, sit on the herbage, without change of position, for hours at a time. A few species are comparatively active, espe-

**Tenthredinidæ—continued.**

cially in bright weather. Sawflies frequent flowers, both to obtain honey or pollen, and to feed on the minute insects that are there found. They are partial to shallow, open flowers, e.g., Buttercups and *Umbelliferae*. The larvæ live on plants. The eggs are laid on leaves, frequently along the lower surface of the veins, or on twigs. In either case, the mother makes a slit for each egg with her saws. Many Sawflies have been found to be parthenogenetic, the females producing fertile eggs without the aid of the males, which, indeed, in some species are still unknown.

The habits of the larvæ vary greatly. Most of them feed exposed on the surface or edge of a leaf, some species

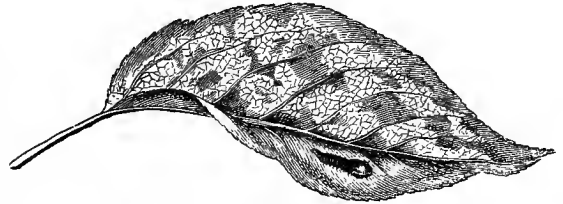


FIG. 14. SLUGWORM, THE LARVA OF *ERIOCAMPA LIMACINA*.

in groups, others singly (see Figs. 13 and 14). Some (*Lyda*) spin silken webs, in which many live, each larva in its own tube, sheltered in the common web. A few live in leaves rolled or folded by themselves to afford them protection. Others bore into twigs. Some are leaf-miners, and others burrow into fruits. A considerable number of species make galls in stems or leaves; many of the gall-makers abound on Willows. The forms of the larvæ vary with their modes of life; but by far the most species have a cylindrical body. A very common position, when at rest or feeding, is to have the front half of the body straight, and the hinder segments rolled spirally inwards (see Fig. 13). In general appearance, the larvæ closely resemble those of many Night Moths, or *Noctuæ*, having, like these, three pairs of true legs, and several pairs of prolegs; but they differ in the number of the latter, often having from six to eight pairs, instead of five pairs, as in *Noctuæ*, and the fifth segment always bears prolegs (if any exist) in Sawfly larvæ, but never in the larvæ of the *Noctuæ*. Sawfly larvæ are protected by their inconspicuous form and colour, or by dropping to the ground, if danger threatens, or by disagreeable excretions on the surface of the body. Some, e.g., Slugworms (see Fig. 14), excrete slimy substances, others bear a flaky coating, &c. Brightly-coloured kinds are mostly protected by disagreeable excretions. Most of them pupate in silken or earthen cocoons, under soil, in crevices, or in other sheltered places.

The more injurious species of Sawflies, and the remedies most effectual against each, will be found discussed at greater length under the following heads: **Gooseberry and Currant Sawfly**, **Lophyrus**, **Lyda**, **Nematus**, **Pine Sawflies**, **Slugworms**, and **Turnip Sawfly**.

**TENTHREDO CERASI.** An old name for *Eriocampa limacina*. See **Slugworms**.

**TENTHREDO GROSSULARIÆ.** A name formerly given to the **Gooseberry and Currant Sawfly** (which see).

**TEPHRITIS ONOPORDINIS.** See *Celery Fly*.

**TEPHRO.** A term which, used in Greek compounds, signifies ash-grey.

**TEPHROSIA** (from *tephros*, ash-coloured; alluding to the colour of the leaves). North American Hoary Pea. Including *Requienia*. ORD. *Leguminosæ*. A large genus (about ninety species) of stove, greenhouse, or half-hardy herbs, sub-shrubs, or rarely shrubs, broadly dispersed over the warmer regions of the globe. Flowers red, purple, or white, in leaf-opposed racemes, or solitary or in pairs in the axils; calyx tube campanulate, the teeth distinct, sub-equal; petals clawed; standard sub-orbicular; keel incurved, not beaked; stamens diadelphous. Pods flattened, two-valved. Leaves usually odd-pinnate; leaflets opposite, often silky beneath. Several of the species are economically valuable, but few of them are very ornamental. A selection from those introduced is here given. All thrive in a compost of sandy peat and leaf mould. Propagation may be readily effected by seeds; or by cuttings, inserted in sand, under a bell glass, those of the stove species in heat.

**T. candida** (whitish). *fl.* reddish or white,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; standard densely silky; racemes copious, terminal and lateral, elongated,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. July. *l.* shortly petiolate,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long; leaflets nineteen to twenty-five, ligulate, acute,  $\frac{1}{4}$  in. to  $\frac{1}{2}$  in. long. India, 1816. A low, stove shrub.

**T. capensis** (Cape).\* *fl.* purple,  $\frac{1}{4}$  in. long, the standard pubescent; racemes interrupted, attenuated, distantly many-flowered; peduncles elongated, slender. July. *l.* rather long-petiolate; leaflets three to six pairs, elliptic, cuneate-oblong, or lanceolate, obtuse or acute. Stems procumbent or trailing, 2ft. to 3ft. long. South Africa, 1825. Greenhouse sub-shrub.

**T. grandiflora** (large-flowered). *fl.* red, fulvouscent on the outside, eight to ten lines long; peduncles terminal and leaf-opposed, fasciculate-corymbose at summit. June. *l.* shortly petiolate; leaflets five or seven pairs, cuneate or linear-oblong, obtuse or acute, retuse or mucronulate. *h.* 1ft. to 2ft. South Africa, 1774. An erect, greenhouse shrub. (B. R. 769, under name of *Galega grandiflora*.)

**T. pallens** (pale). *fl.* pink, four to five lines long, the standard pubescent, the other petals glabrous; racemes dense, many-flowered; peduncles curved,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. July. *l.* shortly petiolate, very spreading or recurved; leaflets five to nine pairs, narrow, cuneate-oblong,  $\frac{1}{2}$  in. long, recurved-pointed. South Africa, 1787. An erect or ascending, greenhouse sub-shrub.

**T. purpurea** (purple). *fl.* pale red,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, silky; racemes copious, elongated, all leaf-opposed,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, loose, the lower flowers fasciated. July. *l.* shortly petiolate,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long; leaflets thirteen to twenty-one, narrow-oblong, obtuse, glabrescent above, obtusely silky beneath. *h.* 1ft. to 2ft. Throughout the tropics, 1768. Stove perennial.

**T. suberosa** (slightly bitten). *fl.* pink; vexillum with a very short, callous claw, broadly oval; peduncles terminal and axillary, racemose, shorter than the leaves. July. *l.* shortly petiolate,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long; leaflets  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, oblong-lanceolate or lanceolate, very pale, silky-canescens. *h.* 4ft. South Africa, 1818. Greenhouse shrub.

**T. virginiana** (Virginian).\* *fl.* yellowish-white, marked with purple, large and numerous, clustered in a terminal, oblong, dense raceme or panicle. June and July. *l.* leaflets seventeen to twenty-nine, linear-oblong. Stem erect and simple, 1ft. to 2ft. high, leafy to the top. North America, 1765. Half-hardy perennial.

**TERAMNUS** (from *teramos*, soft; in reference to the pods and leaves). SYN. *Glycine* (of Wight and Arnott). ORD. *Leguminosæ*. A small, tropical genus of slender, twining, stove herbs. Flowers small, fascicled or racemose; standard ovate, narrowed at base, exappended. Leaves pinnately trifoliate, stipellate. Two species have been introduced, but they are not very ornamental, and are probably no longer in cultivation.

**TERATOPHYLLUM.** Included under *Acrostichum*.

**TEREBINTH-TREE.** A common name for *Pistacia Terebinthus* (which see).

**TEREBINTHUS.** A synonym of *Pistacia* (which see).

**TEREDO.** Any disease in plant life caused by the boring of insects.

**TERETE.** Free from angles; cylindrical or nearly so; tapering.

**TERGEMINATE.** "When each of two secondary petioles bears towards its summit one pair of leaflets, and the common petiole bears a third pair at the origin of the two secondary petioles; as in *Mimosa tergemina*" (Lindley).

**TERMINAL.** Proceeding from the end.

**TERMINALIA** (from *terminus*, end; alluding to the disposition of the leaves). Myrobalan-tree. Including *Badamea*, *Buceras*, *Bucida*, *Catappa*, *Fatira*, *Myrobalanus*, and *Pentaptera*. ORD. *Combretaceæ*. A large genus (eighty to ninety species) of stove, evergreen, erect shrubs or trees, broadly spread over the tropics. Flowers green or white, rarely coloured, small, sessile, in spikes or heads; calyx five-toothed or five-cleft; petals wanting; stamens ten, biserial. Leaves alternate, rarely nearly or quite opposite, often clustered at the tips of the branches, often stalked and entire. A few of the introduced species are here described. The bark of *T. Buceras* is greatly esteemed by tanners. Loam and peat form the most suitable compost for these plants. Propagation may be effected by cuttings, inserted in sand, and plunged in heat, under a glass. With the exception of *T. sericea*, all the species here described are trees.

**T. angustifolia** (narrow-leaved). A synonym of *T. Benzoïn*.

**T. Arjuna** (Arjuna). *fl.*, spikes usually panicle, *l.* sub-opposite, oblong or elliptic, usually  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in., sometimes  $\frac{1}{2}$  in., long, suddenly narrowed at base, often cordate, obtuse or very shortly acute at apex, nearly glabrous beneath when old; petioles rarely more than  $\frac{1}{2}$  in. long, with two glands near the apex. *h.* 60ft. to 80ft. India. (B. F. S. 28.) SYN. *Pentaptera Arjuna*.

**T. Benzoïn** (Benzoïn). *fl.*, racemes axillary, pedunculate, as long as the leaves. *l.* crowded at the thickened tips of the branches; oblong-lanceolate, crenate, obtuse or cuspidate, glabrous, subcoriaceous,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, narrowed into glandular petioles. *h.* 30ft. to 40ft. Mauritius, 1824. A milky juice is said to flow from this tree, which, when dried, is used as incense in Mauritius. SYN. *T. angustifolia*, *T. mauritiana*.

**T. Buceras** (Buceras). *fl.* rather distant; spikes cylindrical, silky or villous-pubescent. *l.* variable, obovate or spatulate-lanceolate, glabrous above, silky and glabrate beneath. *h.* 20ft. to 30ft. West Indies, 1793. A monstrosity of the flowers, transformed into long, cylindrical, arcuate bodies, is peculiar to this species. SYN. *Bucida Buceras* (B. R. 907).

**T. Catappa** (Catappa). Olive Bark-tree; Malabar Almond-tree. *fl.* in short-peduncled, slender, spike-like, axillary racemes. *l.* crowded near the ends of the branchlets, shortly petiolate, obovate, obtuse, entire, membranous,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, glabrous or pilose beneath, with two glands near the base of the midrib. *h.* 60ft. to 80ft. Tropical Asia, &c., 1778. (B. M. 3004.)

**T. Chebula** (Chebula). Negroes' Olive-tree. *fl.*, spikes terminal, often panicle. *l.* not clustered, often sub-opposite, ovate or elliptic, usually acute and rounded at base,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, more or less hairy when young; petioles about  $\frac{1}{2}$  in. long, often with two glands near the summit. *h.* 80ft. to 100ft. India, 1796. (B. F. S. 28; B. F. S. 27.)

**T. latifolia** (broad-leaved). *fl.*, spikes simple, pedunculate, cylindrical. *l.* approximate at the tips of the branches, obovate-oblong,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, glabrate or pubescent beneath, tapering into petioles  $\frac{1}{2}$  in. long, often with small glands or tufts of hair in the vein-axils beneath. *h.* 80ft. to over 100ft. West Indies, &c., 1800.

**T. mauritiana** (Mauritian). A synonym of *T. Benzoïn*.

**T. sericea** (silky). *fl.*, spikes silky, pedunculate, shorter than the leaves. *l.* alternate, crowded at the tips of the branches, oblong or obovate-oblong,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, mucronulate, quite entire, clothed with silky, appressed hairs on both surfaces, narrowed into short petioles. *h.* 6ft. and upwards. South Africa, 1816. Shrub.

**TERMINALIS.** A synonym of *Dracæna*.

**TERNATE.** A whorl of three; three things in opposition round a common axis; e.g., a leaf consisting of three leaflets.

**TERNATEA.** Included under *Clitoria*.

**TERNATELY-DECOMPOUND.** Compound in a ternate manner.

**TERNATELY-VERTICILLATE.** Having three leaves in a whorl.

**TERNSTROMIA** (named after Christopher Ternström, a Swedish naturalist and traveller in China, who

**Ternstroemia**—continued.

diad in 1745). SYN. *Taonabo*. Including *Reinwardtia* (of Korthals). ORD. *Ternstroemiaceæ*. A genus comprising about twenty-five species of stove, evergreen trees or shrubs, of which five or six are found in the warmer parts of Asia and the Indian Archipelago, and the rest in tropical America. Sepals five, closely imbricated; petals five, imbricated, connate at base; stamens indefinite, adnate to the base of the corolla; peduncles one-flowered, recurved, axillary or lateral, solitary or sub-fasciculate, hibracteolate. Leaves coriaceous, entire or crenate-serrate. A selection of the few introduced species is given below. All are shrubs. They thrive in well-drained, fibrous loam, and are readily propagated by cuttings of the half-ripened young shoots, inserted under a bell glass, in bottom heat.

FIG. 15. FLOWERING BRANCH OF *TERNSTROEMIA ELLIPTICA*.

**T. elliptica** (elliptic-leaved). *fl.* white; sepals rounded; peduncles drooping. July. *l.* variable, spatulate or elliptic, 3in. long, rather blunt, quite entire, obsoletely veined. *h.* 6ft. West Indies, 1818. See Fig. 15. SYN. *T. peduncularis*.

**T. peduncularis** (pedunculate-flowered). A synonym of *T. elliptica*.

**T. sylvatica** (sylvan). *fl.* white; petals not lined; anthers apiculate; bracts ovate, acute, under the calyx. July. *l.* lanceolate, obtusely acuminate. Branches smooth. *h.* 2ft. Mexico, 1840.

**T. venosa** (veined). *fl.* white; pedicels aggregate, axillary, a little shorter than the petioles. June to August. *l.* oblong, serrulated, veined. *h.* 6ft. Brazil, 1824.

**TERNSTROEMIACEÆ.** A natural order of trees and shrubs, rarely climbing, mostly inhabiting tropical America and Eastern Asia. Flowers regular, hermaphrodite or rarely diclinous, showy or mediocre, rarely small; petals five, rarely four, six, or seven, free or shortly coalescing at base, the inner ones often larger; petals five, rarely four or six to nine, hypogynous, free or often coalescing at base in a ring or short tube, imbricated or twisted; stamens usually numerous; anthers basifixed and erect, or versatile, two-celled; disk none; ovary free; peduncles axillary, one or many-flowered, or the flowers in terminal, axillary racemes, rarely disposed in elongated panicles; bracteoles under the calyx often two. Fruit sometimes fleshy, coriaceous, or slightly woody and in-

**Ternstroemiaceæ**—continued.

dehiscent, or a loculicidal or septicidal, dehiscent capsule. Leaves alternate or very rarely opposite, simple and undivided, or rarely digitately three to five-foliolate, entire or often serrated, coriaceous or rarely membranous, penninerved; stipules wanting or very rarely minute and highly caducous. The most important economical product of this family is Tea, *Camellia theifera* (= *Thea chinensis*). Although two centuries have not passed since Tea was first used in Europe, the annual importation now exceeds twenty-two millions of pounds. The order comprises about thirty-three genera and 260 species. Examples: *Camellia*, *Caryocar*, *Freziera*, *Ternstroemia*.

**TERPNANTHUS.** A synonym of *Spiranthera* (which see).

**TERRACE.** A raised space of ground, sometimes formed round a mansion, or on the side of sloping ground, usually for the purpose of making a level walk. In some cases, it is necessary to have some arrangement of this sort; but, in many other instances, after having been made at great cost, Terraces have been found most objectionable, because of the walls interfering with views of landscape from the mansion, and also preventing the latter from being seen to advantage when approaching it. A Terrace retained in position by a strongly-built wall, on which flower-vases, &c., are fixed, is more likely to constitute a double block of this sort than when a sloping grass bank is substituted; if the latter can be arranged, it is, therefore, to be preferred when the formation of a Terrace is really necessary. A Terrace-walk may sometimes be introduced with advantage on rising ground, where an exceptionally good

view is at command, that cannot, perhaps, be seen from elsewhere; but the formation of Terraces as architectural features, apart from the necessity of having them, often aestetic, if it does not entirely succeed, in destroying beautiful landscape. The advantages and disadvantages should, therefore, receive full consideration.

**TESSARIA** (named after Luie Tessari, Professor of Botany, &c., at Ancona, writer of works on "*Materia Medica*"). SYNS. *Gynheteria*, of Willdenow (*Gyneteria* of Sprengel), *Phalacromesus*, *Polypappus*. ORD. *Compositæ*. A small genus (five species) of hardy, Western American shrubs. Flower-heads small, cymose, sometimes disposed in an ample corymb; involucre bracts many-seriate; ray florets purplish, pale on the outside. Leaves alternate, entire or toothed. Probably none of the species are now cultivated in this country.

**TESSELLATED.** Chequered; when colours are disposed in small squares.

**TESTA.** The skin or integument of a seed.

**TESTACELLA** (a diminutive of *testa*, a shell; in allusion to the small size of the shell). A genus of Slugs which must be regarded as beneficial in gardens, inasmuch as they feed exclusively on earthworms, following them into their burrows. The body is long and



**Testacella**—*continued*.

slender, so as to pass easily along the burrows. On the hinder part of the back is a small, depressed, ear-shaped shell, about  $\frac{1}{4}$  in. long, which protects the rear of the animal when in the burrows. This external shell at once distinguishes these animals from the true Slugs, which do mischief in gardens. Two species are known in England.

*T. haliotidea* is dirty-yellow, with brown specks, rarely pale yellow, sometimes entirely black; when extended, it is about three inches long. It is said to swallow the worms alive. This species is known to occur in many localities in the South of England, and has been found as far north as Kirkcaldy, in Fifeshire.

*T. Maugei* is a native of South-west Europe, but has naturalised itself near Bristol. It is dark brown, and the shell is larger than in *T. haliotidea*.

**TESTACEOUS.** Brownish-yellow; resembling unglazed earthenware in colour.



FIG. 16. TESTUDINARIA ELEPHANTIPES.

**TESTUDINARIA** (from *testudo*, a tortoise; alluding to a supposed resemblance in the outside roots). ORD. *Dioscoreaceæ*. A small genus (two species) of greenhouse twiners, endemic in South Africa. Flowers diceious,

**Testudinaria**—*continued*.

small, racemose in the axils, resembling those of *Dioscorea*. Leaves alternate, caudate or sub-deltoid. *T. elephantipes*, the species best known to cultivators, is an interesting plant, succeeding well in thoroughly-drained, sandy loam. During the period of rest, it should be kept dry. Increased by imported roots.

**T. elephantipes.\*** Elephant's Foot; Hottentot Bread; Tortoise-plant. *f.* greenish-yellow, sometimes dark-spotted, rather long-pedicellate; male racemes axillary, solitary,  $1\frac{1}{2}$  in. to  $1\frac{1}{2}$  in. long, simple, sometimes simply branched below; females axillary, solitary, pedunculate, few-flowered, scarcely  $\frac{1}{2}$  in. long. July. *l.* broadly cordate-ovate, sub-reniform, with a stout mucro, seven to nine-nerved, complicated. *h.* 10ft. 1774. See Fig. 16. (B. R. 921; B. M. 1347, under name of *Tamus elephantipes*.)

**TETA.** A synonym of *Peliosanthes* (which *see*).

**TETRA.** This term, used in Greek compounds, signifies four: e.g., Tetrapyrenus, four-stoned.

**TETRACARPUM.** A synonym of *Schkuhria* (which *see*).

**TETRACERA** (from *tetras*, four-fold, and *keras*, a horn; alluding to the curved shape of the four capsules). SYN. *Euryandra*, *Wahlbomia*. ORD. *Dilleniaceæ*. A genus including about two dozen species of glabrous or scabrous-pubescent, stove, climbing shrubs or rarely trees, dispersed over tropical regions. Flowers paniculate; sepals four to six, spreading; petals equalling the sepals in number, or rarely fewer; carpels three to five (rarely one or two?). Leaves parallel-penniveined. The few species introduced, having no recommendation beyond their botanical features, are probably lost to cultivation.

**TETRACHOTOMOUS.** When a stem ramifies in fours.

**TETRADENIA** (of Nees). Included under *Litsea* (which *see*).

**TETRADIMUM** (from *tetradeion*, a quaternion; the parts of flowers and fruit are in fours). ORD. *Rutaceæ*. A monotypic genus, now included, by Bentham and Hooker, under *Evodia*. The species is a stove, evergreen tree, requiring culture similar to *Brucea* (which *see*).

**T. trichotomum** (trichotomous-racemed). *f.* whitish, disposed in large, sub-terminal, trichotomous panicles; calyx short, four-parted; petals four, longer than the calyx; stamens four. April and May. *l.* smooth, imparipinnate; leaflets quite entire. *h.* 20ft. Cochín China, 1822. The proper name of this species is *Evodia fraxinifolia*.

**TETRADYNAMIA.** A Linnean class, characterised by the flowers being tetradynamous.

**TETRADYNAMOUS.** "Having six stamens, of which two are longer than the four others, which stand in pairs on opposite sides of an ovary; as in Crucifers" (Lindley).

**TETRAGASTRIS.** A synonym of *Hedwigia* (which *see*).

**TETRAGONAL.** Four-angled.

**TETRAGONIA** (from *tetra*, four, and *gonia*, an angle; alluding to the fruit). SYN. *Demidovia*. ORD. *Ficoideæ*. A genus comprising about a score species of greenhouse or hardy, prostrate or somewhat climbing herbs or sub-shrubs, mostly South African, a few being also found on the shores of Eastern Asia, Australia, and temperate South America. Flowers green, yellowish, or reddish, axillary, solitary or few, sessile or on long pedicels, sometimes sub-spicate; calyx lobes three to five; petals none. Leaves alternate, oblong, linear, ovate, or deltoid, entire, rather thick; stipules absent. *T. expansa*, the only species calling for description here, is grown in gardens as a substitute for summer Spinach. For culture, &c., *see* **New Zealand Spinach**.

**T. expansa** (expanded). New Zealand Ice Plant; New Zealand Spinach. *f.* yellow, small, on very short pedicels or almost sessile in the axils, solitary or twin. *l.* petiolate, the larger ones

**Tetragonia**—continued.FIG. 17. BRANCHLET OF *TETRAGONIA EXPANSA*.

ovate, triangular, or broadly hastate, 2in. to 4in. long, entire, obtuse or acute, the smaller ones narrower. Australia, New Zealand, &c. Plant hardy, decumbent or prostrate, often extending to several feet. See Fig. 17. (B. M. 2362.)

**TETRAGONIACEÆ.** Included under *Ficoideæ*.

**TETRAGONOLOBUS.** Included under *Lotus* (which see).

**TETRAGONOTHECA** (from *tetragonos*, quadrangular, and *theke*, a case; alluding to the four-angled grains). ORD. *Compositæ*. A small, North American genus (three species) of tall, erect, hardy, perennial herbs. Flower-heads yellow, rather large, solitary or loosely corymbose, heterogamous; ray florets ligulate, spreading; involucre explanate, with four bracts in one series; achenes thick, triangular, glabrous or slightly pilose. Leaves opposite, amplexicaul, deeply toothed or incised-pinnatifid. Only one species has been introduced. It is an interesting plant, thriving in any light, rich soil. Propagation may be effected by divisions, or by seeds.

**T. helianthoides** (Sunflower-like). *fl.*-heads pale yellow, large, pedunculate, terminating the branches; involucre 2in. or more in diameter. August. *l.* 5in. to 6in. long, repandly and unequally toothed, or with coarse, sharp, salient teeth. Stem 2ft. to 3ft. high, terete. 1726.

**TETRAHIT.** A synonym of *Galeopsis* (which see).

**TETRAHITUM.** A synonym of *Stachys* (which see).

**TETRAMERIUM.** A synonym of *Faramea* (which see).

**TETRAMICRA** (from *tetra*, four, and *micros*, small; in allusion to the four smaller divisions of the anther). Including *Leptotes*. ORD. *Orchideæ*. A genus including about half-a-dozen species of stove, terrestrial or epiphytal orchids, natives of tropical America, from Brazil to the West Indies. Flowers mediocre, pedicellate; sepals and petals sub-equal, free, spreading; lip affixed to the base of the column, free, spreading, the lateral lobes shortly clawed, the middle one broad, entire; column erect, broadly two-winged above or from the base; raceme simple, loose; peduncle terminal, elongated, slender, rigid. Leaves linear, fleshy, semi-terete or

**Tetramicra**—continued.

very short and thick. Stems leafy, scarcely thickened, not pseudo-bulbous. The best-known species are here described. They thrive under conditions which suit *Sophronitis*. They may be grown on blocks of Tree-fern stem with a little sphagnum round the collar of the plant, or in baskets of fibrous peat, sphagnum, potsherds, and a few pieces of charcoal, intermixed. Cool treatment best suits the species described below, and all like a light place; they do well when suspended near the roof of the cool Orchid house. They are propagated by division.

**T. bicolor** (two-coloured). *fl.* solitary; sepals and petals white linear-oblong; lip having two very short lateral lobes, and an oblong front lobe nearly as long as the petals, white, streaked with purple on the disk; ovary very long, pedunculiform. Winter. *l.* solitary, terminating the stems, terete, recurved, fleshy, grooved above. Rhizome creeping, throwing up several slender stems about 1in. long, almost cylindrical. Brazil, 1831. SYN. *Leptotes bicolor* (B. R. 1625), *L. b.* var. (B. M. 3734).

**T. rigida** (rigid). *fl.*, sepals and petals greenish; lip rosy, purple-striped, exerted, the lateral segments spreading, the middle one roundish-obovate, large; scape distantly sheathed, few-branched above or simple. March. *l.* few, 4in. to 8in. long, half-cylindrical, linear, channelled, acuminate, recurved. *h.* 1ft. to 2ft. West Indies. Plant rigid. SYN. *Brassavola elegans* (B. M. 3088).

**T. serrulata** (serrulated). *fl.* as in *T. bicolor*, but three or four times larger; lip white, with lines of brilliant lake radiating from the base, where it has two short, rounded auricles; scapes terminal, axillary, purple. April and May. *l.* cylindrical, fusiform, grooved, glaucous-green, dotted with purple. Stems sometimes two-leaved. Brazil. SYN. *Leptotes serrulata* (L. S. O. 11).

**TETRANEMA** (from *tetra*, four, and *nema*, a filament; the genus is characterised by having four stamens). ORD. *Scrophularineæ*. A monotypic genus. The species is a pretty, dwarf, perennial, greenhouse herb. In spring, it should be potted in a compost of leaf mould and sandy loam, and placed in the greenhouse, where it will bear a profusion of flowers during the greater part of the summer. The atmosphere of a warm greenhouse is necessary during winter. Propagation may be effected by seeds, or by divisions.

FIG. 18. *TETRANEMA MEXICANA*, showing Habit and detached Flower.

**T. mexicana** (Mexican). Mexican Foxglove. *fl.* shortly pedicellate, on axillary, scape-like peduncles; calyx five-parted; corolla purplish-violet, variegated with a paler colour; stamens four. *l.* sub-radical, opposite, obovate or oblong, loosely crenate-toothed, angled at base, glabrous. Stems very short, or in cultivation slightly elongated and ascending. Mexico, 1843. See Fig. 18. (B. H. 1879, 16; B. M. 4070; B. R. xxix. 52.)

**TETRANTHERA.** A synonym of *Litsea* (which see).

**TETRANTHUS** (from *tetra*, four, and *anthos*, a flower; in allusion to the four flowers—two male and two female—in each head). ORD. *Compositæ*. A small genus (two species) of dwarf, creeping, stove herbs, confined to Domingo. Flower-heads whitish, very small, on solitary, filiform peduncles. Leaves opposite, petiolate, ovate. *T. littoralis*, the only species introduced, is probably now lost to cultivation.

**TETRANYCHIDÆ.** A family of Mites, which feed on living plants, on the leaves of which webs are spun by them. The commonest and most hurtful species is *Tetranychus telarius*, commonly known as the "Red Spider."

**TETRANYCHUS TELARIUS**, or **RED SPIDER**. This is not a Spider, but a true Mite. It is frequently most injurious to cultivated plants, and is peculiarly hurtful to certain fruit-trees (*e.g.*, Plum), to Hollyhocks, and to many of the more delicate greenhouse plants. A good deal of doubt exists as to whether there is only one species of Red Spider, liable to variation in colour, and in other minor points, or whether there are several closely-related species. It matters little to gardeners whether there are more than one or no, since the habits, harm done by them, and remedies against them, are the same for all, and will be discussed here as if there were but one. The creatures are too small to be seen with the unaided eye, save as minute, moving specks on the leaves; but often their numbers render the effects produced by them conspicuous. Their colour is usually some shade between rust-red and brick-red, but some (probably immature) are greenish, with brown specks on the sides. The body is oval, without any separation between the thorax and abdomen (unlike the structure in Spiders). There are four pairs of nearly equal legs, of which two pairs are turned forwards and two backwards. On the upper part of the body, near the front, are two minute eyes, and a beak or sucker, for boring into, and sucking juices from, the leaves of plants. Near the hinder end of the body, on the lower surface, is a conical wart, which is an organ used for spinning threads.

The name Spider has probably been given to these mites because of their powers of spinning. The females lay eggs; from these emerge larvæ, which differ from the adults in their size, and in having only six legs. The mites, when they establish themselves upon plants, spin webs of very fine texture on the backs of the leaves. They then, by means of their suckers, bore into the leaf-cells and suck out the sap. The leaves become yellowish or greyish-green, marbled with paler patches on the upper surface; the glistening web covering the lower surface renders it grey. A severe attack by Red Spider kills the leaves, which fall prematurely; the fruit crop is lessened; and the young branches formed the next year are stunted and weakened.

**Prevention.** Attacks of Red Spider are worst when the growth of plants is checked by drought and heat; hence, any measures that promote growth—such as frequent syringing—diminish the risk to some extent. Plants that show symptoms of being attacked, should be at once separated from the rest, and specially treated. Free access of air is much to be recommended. Soot, caustic lime, and impregnated with spirits of tar, or other similar substances, may be laid round the bases of the stems of the plants to be protected, to prevent the mites from getting access to them. Poles and other supports should have their surfaces planed quite smooth, to prevent the mites from harbouring in crevices, and to allow of being thoroughly washed.

**Remedies.** Sulphur, in the form of Flowers of Sulphur, is almost a certain cure for Red Spider, and for some Fungi. It is sometimes dusted dry on the leaves, but is better employed in solution, *e.g.*, 1lb. of sulphur, boiled with 2lb. of quicklime in four gallons of water; or the sulphuret of lime may be employed, in the proportion of 4oz. of sulphuret to 2oz. of soft soap and one gallon of boiling water. The sulphuret and the soap should be thoroughly mixed, and must be well stirred while the water is being poured on them. The plants may be dipped into the mixture; and it may be applied to the bark with a stiff brush. Various other washes have been found useful; *e.g.*, Gishurst Compound, Veitch's Chelsea Blight Composition, and solutions prepared from quassia-wood. Fumigation with tobacco-smoke, or with sulphur and chalk, mixed in water and painted on the hot-water pipes, is also recommended. To cleanse infested walls, the following method may be employed with success: Add clay to a solution of soot

#### **Tetranychus telarius**—continued.

in water till the mixture is of the consistency of thick paint; then add 1lb. of flowers of sulphur, and 2oz. of soft soap, to each gallon; well mix the whole, and carefully paint the entire surface of the walls with the preparation.

**TETRAPASMA.** A synonym of **Discaria** (which see).

**TETRAPELTIS.** A synonym of **Otochilus** (which see).

**TETRAPOGON** (from *tetra*, four, and *pogon*, a beard; in reference to the bearded flowers). **ORD.** *Gramineæ*. A genus consisting of four species of hardy, tufted, often stoloniferous grasses, natives of North Africa, Abyssinia, and Western Asia. Spikelets two or three-flowered, clustered, secund, or nearly distichous; spikes one, two, or three at the apices of the peduncles; glumes two, the lower one empty; stamens three. Leaves flat. *T. villosus*, the only species introduced, is of no horticultural value.

**TETRAPTERYS** (from *tetra*, four, and *pteron*, a wing; the samaras are four-winged). **ORD.** *Malpighiaceæ*. A genus comprising about fifty-two species of usually climbing, stove shrubs, natives of tropical America, mostly Brazilian. Flowers yellow or reddish; calyx five-parted, with eight glands, rarely ten or none; petals clawed; stamens ten, all perfect, the alternate ones longer; umbels or racemes often panicle, terminal, rarely sub-sessile. Leaves opposite, entire, often transparent, not glandular; stipules two, variable. The species are rather ornamental, but extremely difficult to bring into flower in this country, and it is doubtful whether those described below are still in cultivation. A compost of peat and sand forms the most desirable soil for them. Ripened cuttings will root in sand, under a hand glass, in heat.

**T. citrifolia** (Citrus-leaved). A synonym of *T. inaequalis*.

**T. discolor** (discoloured). *f.* yellow; pedicels hoary-pubescent, articulated at the middle; umbels four-flowered, paniculate. May. *l.* elliptic or elliptic-oblong, bluish or slightly acute, coriaceous, glabrous; stipules interpetiolar, deciduous. Guiana and Trinidad, 1827.

**T. inaequalis** (unequal). *f.* yellow; petals articulated at or below the middle; umbels four-flowered, paniculate. May. *l.* ovate or elliptic, acute, coriaceous; stipules interpetiolar, deciduous. Brazil and Jamaica, 1818. **SYN.** *T. citrifolia*.

**TETRAQUETROUS.** Having four very sharp and almost winged corners or angles.

**TETRASTICHOUS.** Having a four-cornered spike.

**TETRATHECA** (from *tetra*, four, and *theca*, a cell; the anthers are sometimes four-celled). **ORD.** *Tremandraceæ*. A genus embracing eighteen species of small, very pretty, glabrous or glandular-hairy, greenhouse, Australian shrubs. Flowers four or five-parted, rarely three-parted, possessing the peculiarity of only opening during bright sun and on fine days, but closing on the approach of evening, or when rain is imminent; stamens sub-biseriate. Leaves alternate, whorled, or scattered, Heath-like and entire or flat and toothed, or reduced to minute scales. A selection of the introduced species is here presented. They are rather difficult to cultivate. A compost of fibry peat, with plenty of silver sand intermixed, is most suitable. Water must be very carefully administered at all times, and only soft rain-water should be used. Propagation may be effected by cuttings of the young wood, inserted in sand, under a bell glass, and kept well shaded.

**T. ciliata** (hair-fringed). *f.* pink; sepals bearing a few glandular hairs or bristles; petals about  $\frac{1}{2}$  in. long. July. *l.* almost all whorled in threes or fours, broadly ovate or nearly orbicular, obtuse or slightly acute, rarely exceeding  $\frac{1}{2}$  in. in length, the margins flat or scarcely recurved, ciliated or nearly glabrous. Stems slender, erect, or diffuse, 1ft. to 3ft. long.

**Tetratheca**—continued.

**T. ericifolia** (Heath-leaved). *fl.* pink, on slender pedicels usually longer than the leaves; sepals not reflexed. July. *l.* mostly whorled, narrow-linear with the margins closely revolute, or rarely oblong-lanceolate and more open, mostly under *jin.* in length. *h.* 1 ft. or less. 1820. Plant diffuse. (S. E. B. i. 20.)

**T. ericoides** (Heath-like). A synonym of *T. pilosa*.

**T. glandulosa** (glandular). A synonym of *T. pilosa denticulata*.

**T. hirsuta** (hairy).\* *fl.* pink, rather large, on slender pedicels  $\frac{3}{4}$  in. to 1 in. long; sepals lanceolate; petals oblong. March. *l.* mostly alternate, a few whorled, ovate-lanceolate to oblong-linear, obtuse,  $\frac{3}{4}$  in. to 1 in. long, the margins recurved, more or less hirsute above, villous or pubescent beneath. Stems rigid and erect, 6 in. to 18 in. high, often hispida with reddish hairs. 1843. (B. R. 1844, 67; P. M. B. xiii., p. 53.)

**T. juncea** (Rush-like). *fl.* purple; sepals four, small, ovate, obtuse; petals four, about  $\frac{1}{2}$  in. long; pedicels in the upper axils. July. *l.* few, small and distant, scale-like, rarely  $\frac{1}{2}$  in. long. Stems erect or ascending, slender, Rush-like or wiry, 1 ft. to 2 ft. long, with two or three acute angles or very narrow wings. 1803.

**T. nuda** (naked). *fl.* crimson, on slender pedicels; sepals and petals five each. May. *l.* very minute and distant, or a very few linear or oblong ones two or three lines long. Rhizome woody, with numerous erect, slender, rigid, but Rush-like stems, 9 in. to 18 in. high, often ending in an almost pungent point. 1843.

**T. pilosa** (pilose).\* *fl.* purple, rather small, on pedicels usually shorter than the leaves; petals narrow. July. *l.* usually linear, with the margins much revolute, four to six lines long, but in very luxuriant shoots sometimes broadly lanceolate or oblong, with an obtuse base. *h.* 1 ft. to 1 ft. 1823. Plant Heath-like. (F. d. S. 1065, under name of *T. ericoides*.)

**T. p. denticulata** (denticulate-leaved). *fl.*, calyx and pedicels slightly glandular-hairy. *l.* narrow, revolute, occasionally opposite. 1822. (S. E. B. i. 21, under name of *T. glandulosa*.)

**T. thymifolia** (Thyme-leaved). *fl.* purple; sepals ovate-lanceolate, seldom reflexed. July. *l.* almost all whorled in threes or fours, ovate-elliptic or lanceolate, the margins more or less recurved or revolute. *h.* 1 ft. to 3 ft. 1824. Plant very pubescent or hirsute. (S. E. B. i. 22.)

**T. verticillata** (whorled). A synonym of *Platythea galioides*.

**TETRAZYGIA** (from *tetra*, four, and *zugos*, a yoke; alluding to the fourfold arrangement of the parts of the flower). ORD. *Melastomaceæ*. A genus comprising about thirteen species of stove, usually furfuraceous shrubs or trees, inhabiting the West Indies. Calyx tube urceolate or globose, constricted above the ovary, the limb four or five-lobed; petals four or five, obovate, obtuse; stamens eight or ten, equal, the filaments subulate; panicles or corymbs terminal, many-flowered. Leaves petiolate, oblong, ovate, or ovate-lanceolate, entire or denticulated, three to five-nerved. The species here described are well worth cultivating. They require similar treatment to that recommended for *Melastoma*.

**T. angustiflora** (narrow-flowered). *fl.* white, large, but with a narrow calyx; petals five, rarely four, four to five lines long; panicles racemiform, oblong, the primary branches terminated by corymbiform cymes. May. *l.* elliptic or elliptic-lanceolate, abruptly acuminate,  $\frac{3}{4}$  in. to 5 in. long, entire, whitish-downy beneath. Branchlets (and inflorescence) powdery-downy. *h.* 20 ft. 1823. Tree. (B. M. 4333, under name of *T. eleagnoides*.)

**T. discolor** (two-coloured). *fl.* white, small, densely crowded in a corymbiform panicle; petals oval. May. *l.* ovate or ovate-lanceolate, entire, sharp-pointed,  $\frac{5}{8}$  in. to 5 in. long, white beneath with adpressed, scaly down. *h.* 3 ft. 1793. A low shrub.

**T. eleagnoides** (Oleaster-like). *fl.* pink or white, disposed in a corymbiform, or sometimes racemiform, panicle; petals four, three to four lines long. June. *l.* elliptic-lanceolate or lanceolate, sharply acuminate, narrower than those of *T. angustiflora*, whitened beneath by tomentose down. *h.* 2 ft. or more. 1848. Shrub.

**TEUCRIUM** (the old Greek name used by Dioscorides, probably from Teucer, King of Troy, who is said to have first used the plant medicinally). Germander. Including *Polium*, *Scordium*, and *Scorodonia*. ORD. *Labiatae*. A large genus (nearly 100 species) of greenhouse or hardy herbs, sub-shrubs, or shrubs, of variable habit, dispersed over the temperate and warmer regions of the globe. Calyx tubular or campanulate, rarely inflated, five-toothed; corolla limb quasi-bilabiate, obliquely five-lobed, the two upper lobes very small, the two lateral larger, the lowest largest; stamens four; whorls two or rarely many-flowered, axillary, or disposed in spikes, racemes, or heads. Nutlets obovoid, reticulate-wrinkled. Leaves

**Teucrium**—continued.

entire, toothed, or incised, sometimes multifid; floral ones conformed or reduced to bracts. *T. Botrys*, *T. Scordium* (Water Germander), and *T. Scorodonia* (Wood Sage), are British plants. *T. Chamædryas*, an escape from gardens, has become naturalised. *T. Pseudo-Scorodonia* (Bastard Wood Sage), an inconspicuous species nearly allied to the British *T. Scorodonia*, is now and then met with in gardens. Few of the species have any horticultural merit, but several are of medicinal value. All thrive in any moderately good soil. The shrubs may be increased by cuttings, inserted in sandy soil, under a glass, in spring or summer; the perennials by divisions.

**T. betonicum** (Betony-like). *fl.* purplish; corolla tube exserted, pubescent outside, the throat inflated and incurved; whorls two-flowered, secund, loosely racemose; racemes  $\frac{3}{4}$  in. to 6 in. long. May to August. *l.* ovate-oblong, 1 in. to  $\frac{1}{2}$  in. long, on rather long petioles, crenate, woolly below or on both sides; floral ones shorter than the calyx. Branches cano-tomentose. *h.* 1 ft. Madeira, 1775. Greenhouse, evergreen shrub. (B. M. 1114.)

**T. bicolor** (two-coloured). *fl.* blue; peduncles short, axillary, one-flowered, the upper ones sub-racemose. July. *l.* ovate, oblong, or lanceolate, nearly 1 in. long, entire or cut, sometimes trifid; young ones often linear, entire or trifid; floral ones usually exceeding the flowers. Branches 1 ft. to 2 ft. long, acutely tetragonal. *h.* 1 ft. Chili, 1826. Greenhouse, glabrous perennial. SYN. *T. orchideum* (B. R. 1255).



FIG. 19. FLOWERING STEM OF TEUCRIUM CHAMÆDRYS.

**T. Chamædryas** (Chamædryas).\* Wild Germander. *fl.* rosy,  $\frac{3}{4}$  in long, the lower lip spotted with white and red; whorls about six-flowered, in the axils of leafy bracts, or sub-second in leafy, terminal spikes. July to September. *l.* petiolate, ovate, incised-crenate,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, gradually narrowed into the petioles. Stem 6 in. to 18 in. long, ascending, much branched. Rootstock creeping. Europe (naturalised in Britain). A hispidly-hairy perennial. See Fig. 19. (Sy. En. B. 1094.)

**T. fruticans** (shrubby).\* Tree Germander. *fl.* blue, on one-flowered peduncles shorter than the tomentose calyx; racemes terminal or lateral on short branchlets, few-flowered. Summer. *l.* ovate, obtuse, entire, flat, very shortly petiolate, glabrous above, white or rufescent-tomentose beneath. Branches divaricate. *h.* 2 ft. to 3 ft. South Europe, 1869. Greenhouse or half-hardy, evergreen shrub. (Ref. B. 204; S. F. G. 527.) SYN. *T. latifolium* (B. M. 245).

**T. hircanicum** (Hircanian). *fl.* purple, on short, erect, villous pedicels; corolla villous outside; spikes simple, dense,  $\frac{3}{4}$  in. to 8 in. long. September. *l.* petiolate, ovate-ovoid, 1 in. to  $\frac{3}{4}$  in. long, deeply crenate, obtuse, scarcely pubescent above, softly sub-anescent beneath. Stems 1 ft. to 2 ft. high, pubescent, scarcely branched. Persia, 1873. Hardy perennial. (B. M. 2013.)

**T. latifolium** (broad-leaved). A synonym of *T. fruticans*.

**T. Marum** (Marum). Cat Thyme. *fl.* reddish-purple, in pairs at the axils of the upper leaves, forming an oblong, generally rather crowded, nearly one-sided inflorescence; corolla with the median lobe sub-orbicular; calyx hairy, with shortly acuminate, lanceolate, nearly equal teeth. Summer. *l.* shortly stalked,

**Teucrium**—continued.

entire, oval or lanceolate, green, pubescent above, white-woolly beneath. Stems shrubby, erect. *h.* 1 ft. Western Mediterranean region. Hardy. Cats have a strange liking for this plant.

**T. orchideum** (Orchid-like). A synonym of *T. bicolor*.

**T. orientale** (Eastern). *fl.* blue, disposed in a loose, sometimes hispid-pilose panicle; pedicels or peduncles one-flowered, nearly twice as long as the acutely-toothed calyx. July. *l.* once or twice pinnatisect, the lower ones 1 lin. to 2 in. long, broadly ovate in outline, the floral ones minute; segments linear, entire or incised. *h.* 1 ft. Levant, 1725. A hardy, sometimes loosely pubescent or canescent, erect perennial. (B. M. 1279; L. B. C. 1871.)

**TEYSMANNIA** (so called in honour of J. E. Teysmann, a Dutch gardener, who published a "Catalogus Plantarum," in 1838). ORD. *Palmeæ*. A monotypic genus. The species is a dwarf, unarmed, stove Palm, closely allied to *Corypha*, from which it differs mainly in habit. The natives of Sumatra use the leaves of this Palm for thatching their houses, a purpose for which, from their large size and entire form, they are admirably adapted. For culture, see **Corypha**.

**T. altifrons** (tall-leaved). *fl.*, spathes papery-coriaceous, sheathing the fuscous-tomentose peduncle and the spadix branches; spadix rather short, with deflexed branches. *fr.* as large as an apple, globose or depressed-globose, one-celled, one-seeded. *l.* erect, elongated-rhomboid, obtuse, acute at base, 6 ft. to 7 ft. long, 1 ft. wide, induplicate plicate, laciniate on the margins, the segments obtusely bifid; petioles carinate at back, obsoletely concave in front, the angles rounded, uncinately-prickly. Caulis subterraneous. Sumatra.

**THALAMIA**. A synonym of **Phyllocladus** (which see).

**THALAMIFLOUS**. When the stamens arise immediately from the thalamus.

**THALAMUS**. The receptacle in a flower; the part on which the carpels are placed.

**THALASIUM**. A synonym of **Panicum** (which see).

**THALIA** (named in honour of J. Thalinus, a German physician and botanist, who died in 1588). SYN. *Peronia*. ORD. *Scitamineæ*. A genus embracing about five species of stove, greenhouse, or hardy herbs, natives of tropical America, one species extending as far as the Southern United States, and one being found in tropical Africa. Flowers in pairs, pedicellate, loosely spicate; sepals three, free, equal, membranous, equalling or much shorter than the corolla; petals three, free or very shortly connate at base, equal or the dorsal one scarcely broader; androecious tube short, the lobes petaloid, very irregular; panicle terminal; bracts spreading under the branchlets, deciduous. Leaves few, ample; floral ones sometimes conformed. *T. dealbata*, the only species that calls for description here, is an aquatic plant, sufficiently hardy to withstand the severity of our winters, provided it be planted about 2 ft. beneath the surface of the water. It is a very elegant subject for aquaria. Propagation may be effected by division of the rootstock.

**T. dealbata** (whitened). *fl.* purple, small; valves of the spathe unequal, ovate, coriaceous; spikes erect; panicle erect, dense, smooth, the branches not longer than the lanceolate, deciduous bracts at their base; scape terete, Reed-like, 3 ft. to 5 ft. high. June to September. *l.* distichous, long-petiolate, cordate-ovate, acute, 6 in. to 9 in. long; petioles 1 ft. to 2 ft. long. South Carolina, &c., 1791. Plant dusted over with a minute, white powder; otherwise smooth. See Fig. 20. (B. M. 1690.)

**T. sanguinea** (blood-coloured). A synonym of *Stromanthe sanguinea*.

**THALICTRUM** (the old Greek name used by Dioscorides, probably derived from *thallo*, to grow green; alluding to the bright colour of the young sprouts). Meadow Rue. ORD. *Ranunculaceæ*. A genus embracing about thirty species of hardy herbs, with perennial stems, nearly all inhabiting North temperate and frigid regions. Flowers green, yellow, purple, or white, often polygamous, paniculate or rarely racemose, usually small with the anthers conspicuously exserted, or rarely larger with smaller anthers; involucre and petals wanting; sepals

**Thalictrum**—continued.

four or five, petaloid; achenes often compressed. Leaves ternately decomposed; canine ones, when present, alternate. Among the species, three of which are included in the British Flora, there are several well deserving of a place at the back of the flower border. A representative selection of the most desirable kinds is presented below. Any fairly good garden soil is suitable. The plants may be multiplied by divisions.

**T. alpinum** (alpine). *fl.* few; sepals four, purplish; raceme drooping, afterwards erect, simple. July and August. *l.* biternate; leaflets ½ in. to ¾ in. long, sub-orbicular, glaucous beneath, obtusely lobulate. Stem 4 in. to 10 in. long, often stoloniferous. Europe (Britain), Asia, and North America. (B. M. 2237; Sy. En. B. 2.)

**T. anemonoides** (Anemone-like).\* Rue Anemone. *fl.* several in an umbel; sepals five to ten, white, rarely pinkish, oval, ½ in. long. Early spring. *l.* bi- or ternately compound; leaflets roundish, cordate at base, long-petiolulate. Stem arising from a cluster of thickened, tuberous roots. *h.* 6 in. North America, 1768. (L. H. 1829, 211; S. B. F. G. ser. ii. 150; B. M. 866 and L. B. C. 964, under name of *Anemone thalictroides*.)

**T. a. flore-pleno** (double-flowered). This only differs from the type in having double flowers. (F. d. S. 1155; L. B. C. 770.)



FIG. 20. THALIA DEALBATA.

**Thalictrum**—continued.

- T. aquilegifolium** (Columbine-leaved). \* Feathered or Tufted Columbine. *fl.* disposed in a corymbose panicle; sepals white, fugacious; stamens usually purple, sometimes white. May to July. *l.* tripinnate; leaflets sub-orbicular, smooth, deeply toothed; stipules ovate, twin. Stem fistular, purple, mealy. *h.* 1ft. to 3ft. Europe and Asia, 1731. (B. M. 1818; J. F. A. 318.)
- T. a. atropurpureum** (dark purple). \* Stamens and stems dark purple.
- T. a. formosum** (beautiful). Stamens dark purple, dilated at apex. (B. M. 2025.)
- T. a. roseum** (rosy). *fl.*, sepals rose-coloured. 1880.

FIG. 21. PANICLE OF *THALICTRUM FLAVUM*.

- T. flavum** (yellow). False Rhubarb; Fen Rue, &c. *fl.* often umbellate, erect, crowded; sepals pale yellow, small; anthers bright yellow; panicle compound, sub-corymbose or pyramidal. July and August. *l.* ternately bi- or tripinnate; leaflets 1lin. to 1½in. long, three-lobed. Stem 2ft. to 4ft. high, stout. Rootstock yellow, creeping. Europe (Britain) and Asia. See Fig. 21. (Sy. En. B. 8.)
- T. glaucum** (glaucous). *fl.* crowded in an erect, compound panicle; sepals four or five, yellow. June and July. *l.*, leaflets ovate-orbicular, three-lobed; lobes deeply toothed. Stem erect, round, striated, mealy. *h.* 2ft. to 5ft. South Europe, 1798.
- T. minus** (lesser). *fl.* yellow, green, drooping, in lax panicles. Summer. *l.* triangular, three or four-pinnate; leaflets variable, acute or obtusely-lobed, often glaucous. Northern hemisphere (Britain). (Sy. En. B. 3.) Some of the forms of this species make desirable border or pot plants on account of their beautiful Maidenhair-like foliage.
- T. petaloideum** (petaloid-sepal). *fl.* corymbose; sepals white, nearly round; filaments flesh-coloured; anthers yellow. June and July. *l.* ternately decompound; leaflets smooth, ovate, obtuse, entire or three-lobed. Stem round, almost naked. *h.* 1½ft. Dahuria, 1799. (L. B. C. 891.)
- T. tuberosum** (tuberous-rooted). \* *fl.* loosely corymbose; sepals five, white, oval, blunt. June. *l.* crowded, petiolate, bi-tripinnate; leaflets orbicular, three-lobed, smooth. Root grumose. *h.* 1ft. Spain, 1713.

**THALLUS.** A fusion of leaves and stem into one general mass.

**THAMNEA** (from *thamnos*, a shrub; alluding to the nature of the plant). ORD. *Bruniaceæ*. A monotypic genus. The species is a pretty, little, greenhouse under-shrub. It thrives in a compost of peat and sand. Propagation may be effected by cuttings, inserted in sand, under a glass.

**Thamnea**—continued.

- T. uniflora** (one-flowered). *fl.* white, small, terminal, solitary; calyx adnate with the ovary, five-lobed; petals five, with two-keeled claws and an ovate, spreading limb; stamens five, included. April. *l.* very small, somewhat rhomboidal, short, blunt-keeled, closely pressed, spirally inserted; upper ones rather longer, forming an involucre to the flower. Branches filiform, erect, fastigiate. *h.* 1ft. South Africa, 1810.

**THAMNOCHORTUS** (from *thamnos*, a shrub, and *chortos*, grass; alluding to the habit of the plants). Shrubby Grass. ORD. *Restiaceæ*. A genus comprising ten species of greenhouse, perennial herbs, confined to South Africa. Flowers diceious, arranged in spikelets. Flowering stems from a creeping or short and erect rhizome, Rush-like, undivided. *T. dichotomus* has been introduced, but it possesses no horticultural merit.

**THAMNOPTERIS.** Included under *Asplenium*.

**THAPSIA** (the old Greek name used by Theophrastus, so called from the Island of Thapsos). Deadly Carrot. Including *Melanoselinum* and *Monizia*. ORD. *Umbelliferae*. A small genus (four species) of greenhouse or half-hardy, perennial (or biennial?), tall herbs, sometimes having a very elongated, shrubby stem, natives of the Mediterranean region and Madeira. Flowers yellowish, dirty-white, or purplish, in compound, many-rayed umbels; calyx teeth small; petals inflexed at apex, shortly acuminate; involucre often wanting. Leaflets pinnately decompound; segments incised-pinnatifid. *T. garganica* has long been celebrated among the Moors for its healing qualities. The species thrive in loamy soil. They may be increased by seeds, or by breaks from the carrot-like root.

- T. decipiens** (deceiving). Black Parsley. *fl.* white; petals obovate, emarginate; involucre composed of many cut leaves. June and July. *l.* tripinnate; leaflets ovate, acuminate, serrated, the ultimate ones usually confluent; petioles sheathing. Stem terete, simple, naked below, shrubby. *h.* 6ft. Madeira, 1867. (B. M. 5670.)

**T. edulis** (edible). *fl.* white, small, disposed in compound, many-rayed umbels, furnished with partial and universal involucres of entire leaflets. May. *l.* large, decompound, fern-like, in tufts, from 1ft. to 3ft. in length (including the stalks). *h.* 4ft. Madeira, 1857. The roots, which have long, curved, horn-like divisions, and are black outwards and white within, are eaten in Madeira. SYN. *Monizia edulis* (B. M. 5724).

**T. garganica** (Garganian). Drias-plant. *fl.* yellow; involucre few-leaved. July and August. *l.* bi-tripinnatisect, shining; segments linear, acute, elongated, quite entire along the margins, decurrent or confluent. Stem terete, glabrous. *h.* 2ft. to 4ft. Mediterranean region, 1683. (B. M. 6293; S. F. G. 287.)

**T. villosa** (villous). *fl.* yellow; involucre and involucels almost wanting. June and July. *l.* tripinnate, and, as well as the petioles, villous; leaflets oblong, sinuately pinnatifid, the lower ones deflexed. Stem terete, glabrous. *h.* 3ft. to 4ft. South Europe, 1710.

**THATCH PALMS.** A native name for various species of *Euterpe*, *Sabal*, *Thrinax*, &c.

**THEA.** Included under *Camellia* (which see).

**THECA.** A synonym of *Tectona* (which see).

**THECA.** A spore-case; a sac, tube, shell, or any kind of case containing spores.

**THECOSTELE** (from *theke*, a receptacle, and *stèle*, a column; in allusion to the shape of the gynostegium). ORD. *Orchidææ*. A monotypic genus. The species, a stove, epiphytal Orchid, native of Malacca and the Malayan Archipelago, and bearing a simple raceme of mediocre flowers, is as yet unknown in cultivation.

**THELA.** A synonym of *Plumbago* (which see).

**THELEBOLUS** (from the Greek words *thele*, a nipple, and *bollo*, I throw; in allusion to the form of the Fungus, and to the mode of ejecting the spores, described below). A small genus of Fungi, which spread over decaying leaves and sticks, and upon the soil in woods during winter. Only one species (*T. terrestris*) is known to be British, and this is by no means common. It forms yellowish patches, sometimes several inches in breadth, composed of a woolly mycelium, on which are numerous smooth, hemispherical bodies; each of these



**Thelebolus**—continued.

is about  $\frac{1}{4}$  in. in diameter, and is surmounted above by a prominent, round mouth. In these bodies the spores are formed, and when they are ripe for being scattered they are pushed, or thrown, from the mouth in a mass which resembles a small nipple in form; hence the name of the genus. When the spores have all been ejected, the top of the Fungus sinks in, so that it resembles a cup. This plant is not of any practical importance to gardeners, though the yellow patches formed by it render it very conspicuous.

**THELEPHORA** (from *thelé*, a nipple, and *phero*, to bear; in allusion to nipple-like growths on the surface of the hymenium in some of the species). A genus of Fungi, most of which grow on the ground in woods. A few, however, are found on tree-trunks or stumps, and at times do mischief to the wood, burrowing between and through the annual rings of growth. *Thelephora* belongs to the group of Mushrooms in regard to the structure of the hymenium, or part on which the spores are formed, and in four spores being formed from each large cell of the hymenium (see **Mushrooms**); but it differs from the true Mushrooms in having the hymenium smooth, or bearing mere ridges or warty growths, instead of being spread over gills; and the texture is firm and dry—indeed, almost leathery.

The reproductive organs of *T. laciniata* appear on the diseased trunks in the form of horizontal, semicircular plates, attached by the middle to the bark or wood; a number of such plates uniting, and overlapping one another, to form a mass  $\frac{1}{4}$  in. or more across. They are covered above with a coat of fibrous or scaly hairs, prolonged round the margins; and each bears the downy, warty hymenium on its lower surface. The whole mass is dull rusty-brown. This Fungus is usually found among the leaves and other plant-remains in the soil in woods; but it often grows closely around the stems or branches of young trees, and thereby kills small or weakly plants, although it is not a true parasite. It is unsafe to form nurseries for seedlings where *T. laciniata* abounds, though this species is seldom dangerous to older trees.

Dr. Hartig, the well-known German writer on the diseases of trees, has described (in the "Lehrbuch der Baumkrankheiten") a disease of Oak-trunks, widely met with in Germany, which he attributes to a Fungus, named by him *T. Perdis*. The specific name is the Latin word for a partridge, and alludes to the fact that the wood in which it grows often resembles in its mottlings the plumage of a partridge. The diseased wood turns to a deep red-brown, with numerous white spots of mycelium. These spots soon become closed cavities, which are lined with the pale threads of the Fungus. The wood rots, turning dark brown, and the cell walls and cell contents decay. The reproductive organs, which are the most readily recognised parts of the Fungus, are semicircular plates from  $\frac{1}{4}$  in. to  $\frac{1}{2}$  in. across, and of a brown-yellow colour; and they grow on the surface of dead branches, or in hollow spaces in the trunks. These plates continue to increase in size year after year. Though so frequent in Germany, *T. Perdis* does not appear to have been recorded as British.

Another Fungus formerly known as *T. hirsuta*, but now named *Stereum hirsutum*, is very frequent in Britain, on stumps and dead wood of many species of trees. It also is regarded by Dr. Hartig as at times very hurtful to Oak-wood. In general appearance it is much like a true *Thelephora*, but differs in having between the hymenium and its support (pileus) a fibrous layer that is not present in *Thelephora*. The reproductive bodies of *Stereum hirsutum* are somewhat like those of *T. laciniata* in general form; but they are usually pale, and are covered above with grey or pale down, and the hymenium

**Thelephora**—continued.

is yellowish. Where this Fungus gains an entrance into an Oak-trunk, the wood becomes brown, at first on one side, then gradually all round, in concentric layers. In the brown wood there next appear snow-white or yellowish, longitudinal streaks, which, in cross-sections of the trunk, show themselves in the form of small spots. Where air gains free access, through cracks, &c., the wood may become uniformly yellowish, the middle layer of the wall between the cells is dissolved out, and the tenacity of the wood is destroyed by the cells thus becoming separated. Fortunately, *Stereum hirsutum* does not often attack healthy trees. As is the case with almost all internal parasites, comparatively little can be done to cure the evil in a tree; though timely removal of diseased branches may prevent the mycelium from reaching the trunk. But, except in the case of choice specimens, the wise course is to remove and burn, without delay, such trees as show signs of being occupied by the Fungi, in order to prevent the latter from spreading to healthy plants.

**THELESERMA** (from *thelé*, a nipple, and *sperma*, seed; alluding to the nipple-like protuberances on the achenes). SYN. *Cosmidium*. ORD. *Composite*. A small genus (four or five species) of stove or greenhouse, glabrous herbs or sub-shrubs; one is found in extra-tropical South America, and the rest are Mexican. Flower-heads mediocre, heterogamous, on long peduncles; involucre duplex; ray florets, when present, yellow; disk often purplish; achenes glabrous, smooth or tubercled. Leaves opposite, or the upper ones alternate, linear, often filiform, once or twice pinnatifid or the uppermost ones undivided. The species are probably not now in cultivation in this country.

**THELIGONUM**. See *Thelygonum*.

**THELYGONUM** (an old Greek name, from *thelygonos*, begetting girls; it was said by Pliny to give the power of producing female offspring). Sometimes spelt *Theligionum*. SYN. *Cynocrambe*. ORD. *Urticaceæ*. A monotypic genus. The species, *T. Cynocrambe* (Dog's Cabbage), is a hardy, slightly fleshy, procumbent, annual herb, broadly dispersed over the Mediterranean region. It is occasionally cultivated as a potherb, but has no value from a horticultural standpoint.

**THELYMITRA** (from *thelys*, a woman, and *mitra*, a cap; alluding to the hood-shaped column). Woman's-cap Orchid. Including *Macdonaldia*. ORD. *Orchideæ*. A genus comprising about twenty species of greenhouse, terrestrial Orchids, with ovoid tubers; one is broadly dispersed through Australia, New Zealand, New Caledonia, and the Malayan Archipelago, three or four are indigenous to New Zealand, and the rest are all Australian. Flowers blue, purple, red, or yellow, occasionally white, usually several in a terminal raceme; sepals, petals, and lip, all nearly equal and spreading; column rather short, erect, broadly winged; pollen masses granular; bracts shorter than the flowers. Leaves linear, lanceolate, or rarely ovate, sometimes rather thick, but not terete. Stems simple, one-leaved. A selection of the introduced species is given below. All of them are Australian. For culture, see **Bletia**.

**T. carnea** (fleshy). *f.* pink, one to three; sepals and petals oval-elliptic, oblong, or obtuse, usually about four lines long. May. *l.* narrow-linear. Stem slender, often flexuous, less than 6 in. to nearly 12 in. high. 1820.

**T. Forsteri** (Forster's). A synonym of *T. longifolia*.

**T. graminea** (grass-like). A synonym of *T. longifolia*.

**T. ixioideis** (Ixia-like). *f.* blue, pedicellate, usually forming a raceme 4 in. to 6 in. long; sepals, petals, and lip, elliptic-oblong, nine to ten lines long. May. *l.* long-linear or linear-lanceolate, flat or channelled, with one or two shorter ones. Stem usually above 1 ft. high. 1810. (S. E. B. 29.)

**T. longifolia** (long-leaved). *f.* blue, lilac, or pink, rather large, several in a raceme; column wing produced behind and over

**Thelymitra**—continued.

the anther into a broad hood, usually conspicuous from its dark colour. May. *l.* long, narrow. *h.* variable, usually about 1ft. 1824. **SYNS.** *T. Forsteri*, *T. graminea*, *T. pauciflora*.

**T. pauciflora** (few-flowered). A synonym of *T. longifolia*.

**T. variegata** (variegated). *f.* purple, two to four, large; sepals and petals lanceolate, shortly acuminate or acute,  $\frac{3}{4}$ in. to 1in. long, variegated. May and June. *l.* with a villous sheath, the blade usually glabrous, linear, much dilated at base and often undulated. Stem not very stout, 1ft. high or rather more. **SYNS.** *Macdonaldia spiralis*, *M. variegata*.

**T. venosa** (veined). *f.* blue, six to ten; sepals and petals  $\frac{1}{2}$ in. to  $\frac{3}{4}$ in. long; column broadly winged. April. *l.* long, narrow. Stem 1ft. to 2ft. high. 1825. **SYN.** *Macdonaldia venosa*.

**THELYPOGON.** A synonym of **Telipogon** (which see).

**THEMISTOCLESIA** (named in honour of the Greek statesman Themistocles). Including *Centrostemma*. **ORD.** *Vacciniaceæ*. A small genus (four species) of glabrous, villous, or pubescent, stove, evergreen shrubs, with slender, pendulous branchlets, inhabiting the Andes of Peru, Bolivia, and Venezuela. Flowers disposed in short racemes; calyx tube continuous with the pedicel, campanulate or obconical, the limb minutely five-toothed; corolla tubular, the base or middle of the tube slightly swollen, the limb small, with five recurved teeth; stamens ten, as long as the corolla. Leaves alternate, sub-sessile, rounded or cordate at base, ovate, long caudate-acuminate, coriaceous. *T. coronilla*, the only species calling for description here, thrives in a compost of turfy loam, peat, and sand. It may be increased by cuttings, which readily root in sand or soil, with or without the protection of a glass.

**T. coronilla** (small-crowned). *f.*, calyx short, pale green; corolla dark red and shining, glabrous, narrow-urceolate or tubular and inflated below, obscurely five-angled; pedicels axillary, solitary or in pairs. January. *l.* numerous, spreading and deflexed,  $\frac{1}{2}$ in. long, obtuse, entire, often glabrescent above, pale beneath. Branches stout, and, as well as the leaves, peduncles, and calyces, softly hairy. Venezuela, 1866. A small shrub. (*I. H. n. s. 33.*) **SYN.** *Thibaudia coronaria* (B. M. 5575).

**THENARDIA** (named by Kunth in honour of his friend L. J. Thenard, a Frenchman, who wrote on the chemical physiology of plants). **ORD.** *Apocynaceæ*. A monotypic genus. The species is an interesting, glabrous, stove, climbing shrub, requiring similar treatment to that recommended for **Dipladenia**.

**T. floribunda** (bundle-flowered). *f.* pink, broad, in nearly umbelliform cymes; calyx somewhat five-parted; corolla tube very short, sub-rotate, the lobes five, broad, spreading, twisted; pedicels elongated. June. *l.* opposite,  $\frac{2}{3}$ in. to  $\frac{3}{4}$ in. long. Branches terete, slender. *h.* 10ft. Mexico, 1823.

**THEOBROMA** (from *theos*, god, and *broma*, food; referring to the well-known produce of the seeds of *T. Cacao*). **SYN.** *Cacao*. **ORD.** *Sterculiaceæ*. A small genus (about half-a-dozen species) of stove trees, inhabiting the warmer parts of America. Flowers rather small; calyx five-cleft or five-parted; petals five, encnllate-concave and contracted into a claw at base, produced above into a spatulate hood; stamens opposite the sepals; peduncles axillary or lateral, one-flowered and fasciated or racemously many-flowered. Fruit often large, drupaceous, with a woody, five-celled stone; seeds enveloped with pulp. Leaves ample, oblong, undivided, pinninerved or three to five-nerved at base. To dilate on the immense economic value of the seeds of *T. Cacao* would be beyond the scope of this work. It may be remarked, in passing, that the annual European consumption of *Cacao* seeds, in the form of chocolate, &c., is estimated at nearly 40,000,000lb., the Spaniards being the largest consumers. *T. Cacao* will thrive under the same treatment as that recommended for **Ticorea**.

**T. Cacao.** *Cacao* or *Cocoa* Plant; Chocolate Nut Tree. *f.* fasciated; calyx rose-coloured, the segments lanceolate, acuminate, exceeding the yellowish corolla. May. *f.* yellow or reddish, ovoid-oblong,  $\frac{1}{2}$ in. to  $\frac{3}{4}$ in. long, containing fifty to a hundred seeds. *l.* oblong, acuminate, glabrous, quite entire. *h.* 16ft. to 18ft. Trinidad, &c., 1739. (*L. B. C. 545.*)

**THEODOLITE.** An expensive levelling instrument, used by land surveyors for determining important levels and ascertaining the relative heights of objects widely separated from each other. It is provided with a telescope, mounted so that it can be moved to any angle, and a spirit level and adjusting screws for fixing the instrument in its proper position when in use. If the employment of a Theodolite is requisite in a garden, a surveyor generally supplies the instrument and superintends its management.

**THEOPHRASTA** (named after Theophrastus, the celebrated Greek botanist, who lived about 370-285 B.C.). **ORD.** *Myrsinææ*. A monotypic genus. The species is a glabrous, stove, evergreen shrub, with robust, erect, nearly simple stems. It thrives in a compost of peat and loam. Cuttings of half-ripened shoots will root in sandy loam, with a surface consisting wholly of sand, if placed in bottom heat, under a bell glass.

**T. imperialis** (imperial). A synonym of *Chrysophyllum imperiale*.

**T. Jussel** (Jussieu's). *f.* white, rather large, numerous in short racemes; calyx of five ovate, erect segments; corolla cylindrical-campanulate, five-lobed at apex, the lobes spreading; stamens five, affixed to the base of the corolla. *l.* sub-terminal, clustered, spreading, very shortly petiolate, linear-oblong, spiny-toothed, reticulate-nerved. *h.* 3ft. St. Domingo, 1818. (B. M. 4239.)

**T. longifolia** (long-leaved). A synonym of *Clavija ornata*.

**T. macrophylla** (large-leaved). A synonym of *Clavija Reideliana*.

**T. smaragdina** (emerald-green). A synonym of *Deherainia smaragdina*.

**THERA** (Carpet Moths). A genus of slender-bodied Moths, from 1in. to 1 $\frac{1}{2}$ in. in spread of front wings, which are grey, with a broad, brown cross-band in the centre. The larvæ feed on the leaves of *Coniferæ*; but seldom do appreciable harm. See also **Pinus**.

**THERESIA.** Included under *Fritillaria*.

**THERMIA.** A synonym of **Thermopsis** (which see).

**THERMOMETER.** An instrument need for measuring the intensity of heat; one of the most useful and essential in gardens, particularly in glass houses, where the occupants have to be subjected to temperatures regulated to meet their several requirements. An ordinary Thermometer consists of a fine glass tube, with a bulb at one end. In this either some mercury or spirit is placed, and, as it expands or contracts in the tube, the amount of rise or fall in the temperature is indicated. When a Thermometer is made, all air is expelled from the tube and the end is hermetically sealed. The space not filled with the mercury or spirit is thus rendered vacuum, or nearly so, and there is no resistance to the expanding substance when the temperature rises. Every Thermometer tube is provided with a frame of some sort, on which the scale of degrees is marked, to denote the temperature which the expanding or contracting substance indicates. Fahrenheit's scale is in general use in this country; there are two others, known respectively as Reaumur's and the Centigrade; the last-named is generally adopted on the Continent. Fahrenheit's scale fixes the freezing-point at 32 deg., and the point at which water boils at 212 deg. In Reaumur's scale, freezing-point is Zero, and boiling-point 80 deg. In the Centigrade scale, the freezing-point is Zero, as in Reaumur's, but boiling-point is 100 deg. The three are, therefore, quite different to read, because of the spaces on the scales between freezing and boiling-points being differently divided.

There are various kinds of Thermometers in use where meteorological observations are taken; many of these are made in special ways, for special purposes: thus, a Maximum registers the highest, and a Minimum the lowest, temperature which has been experienced since the indicators in either of the instruments were last set;

**Thermometer**—continued.

a Solar Radiation is specially made for indicating the highest temperature in the sun's rays; and there is also a Minimum, for laying on the grass. In all gardens, a minimum registering Thermometer is most desirable, for ascertaining the lowest degree reached in frosty weather during any given period; it should be suspended in a position with north aspect, where there is a fair exposure. Ordinary Thermometers, if correctly graduated to the scale, are well adapted for all horticultural purposes under glass. There are also special ones made for use in Mushroom-beds, or other places where there is bottom heat.

**THERMOPSIS** (from *Thermos*, a Lupine, and *opsis*, resemblance; the species are not unlike Lupines). *SYN. Thermia*. *ORD. Leguminosæ*. This genus embraces about a dozen species of hardy, perennial herbs, natives of North America and Asia (Siberia and Himalayas). Flowers yellow or rarely purple, rather large, in terminal or leaf-opposed racemes; calyx teeth or lobes sub-equal, or the two upper ones connate in one; standard sub-orbicular; keel equalling, or slightly longer than, the wings; stamens free; pedicels solitary. Pods sub-sessile or shortly stipitate. Leaves perfectly alternate, digitately trifoliolate; stipules leafy. The following species have been introduced. They are elegant subjects, but rather difficult to preserve. They succeed best in a light, rich soil. Propagation is most safely effected by means of seeds; for when the plants are separated at the roots, they often decline.



FIG. 22. THERMOPSIS MONTANA, showing Habit and detached Flower.

**T. barbata** (bearded).\* *fl.* six to twelve, shortly pedicellate, opposite or ternate; corolla deep purple, lin. long. June. *l.* sessile, sub-glabrescent, often opposite; leaflets oblanceolate; stipules resembling the leaflets both in texture and shape. Stems 1 ft. or more high, copiously dichotomously branched. Rootstock woody. Himalayas, 1854. (B. M. 4868.)

**T. corgonensis** (Corgon). *fl.* yellow, twin on the racemes, nearly sessile; calyx villous. June and July. *l.* sessile or very shortly petiolate; leaflets ovate, acute; stipules constituting with the leaflets a kind of half-whorl. *h.* 1 ft. to 2 ft. Corgon Alps, 1820.

**T. fabacea** (Bean-like). A synonym of *T. montana*.

**T. lanceolata** (lance-shaped). *fl.* yellow, twin or somewhat whorled; calyx cleft to the middle; bracts large; racemes terminal. June and July. *l.* nearly sessile, the lower and the highest ones often simple; leaflets oblong-lanceolate, silky-puberulent on both sides; stipules half the length of the

**Thermopsis**—continued.

leaflets. *h.* 1 ft. Kantschatka, 1779. *SYN. Podalyria lupinoides* (B. M. 1389).

**T. montana** (mountain).\* *fl.* yellow, alternate; racemes terminal. June and July. *l.* petiolate; leaflets broadly oval; stipules broadly ovate, obtuse, shorter than the petioles. *h.* 1 ft. to 2 ft. North America, 1818. See Fig. 22. (B. M. 3611; B. R. 1272; L. B. C. 1856.) *SYN. T. fabacea*.

**T. nepalensis** (Nepal). A synonym of *Piptanthus nepalensis*.

**THEROLEPTA**. A synonym of **Marshallia** (which see).

**THEROPOGON** (from *theros*, summer, and *pogon*, a beard; in allusion to the time of flowering and the tuft-like appearance of the plant). *ORD. Liliacæ*. A monotypic genus. The species is a greenhouse, herbaceous perennial, of tufted habit, with grass-like leaves and the general habit of *Anthericum*, of frequent occurrence in the Himalayas. The most suitable soil for the cultivation of this plant is one composed of sandy loam and leaf mould. Propagation may be effected by seeds, sown on a hotbed, during spring; or by divisions.

**T. pallidus** (pale).\* *fl.*, perianth white, sometimes tinged with red, three to four lines long, the segments broad, imbricated; pedicels solitary; raceme terminal, loose, 2 in. to 3 in. long, ten to twenty-flowered; scape slender, firm, shorter than the leaves. Spring. *l.* six to eight, nearly 1 ft. long, persistent, glabrous, two to three lines broad, distinctly ribbed, green above, glaucous beneath. 1875. (B. M. 6154.)

**THESIUM** (*Thession* was the old Greek name used by Theophrastus for this or some similar plant; probably derived from Theseus, the legendary hero). *ORD. Santalacæ*. A large genus (over 100 species) of stove, greenhouse, or hardy herbs, natives of temperate and tropical regions; two are found in Brazil; the rest are wholly absent in America. Flowers spicate or racemose, or one to a peduncle, or forming a compound, cymose inflorescence. Leaves alternate, linear, often small, sometimes reduced to minute scales. A few of the species have been introduced, but they are unworthy of cultivation.

**THESPESIA** (from *thespesios*, divine; *T. populnea* is frequently planted about churches in the tropics). *ORD. Malvacæ*. A small genus (about half-a-dozen species) of stove trees or tall herbs, found in tropical Asia, the Pacific Islands, and Madagascar. Flowers often yellow, showy; calyx not conspicuously dotted, truncate, rarely five-cleft; ovary five-celled. Leaves entire or angular-lobed. Two species have been introduced; both are trees. They thrive in a compost of loam and peat. Ripened cuttings will root freely in sand or mould, under a hand glass, in heat.

**T. grandiflora** (large-flowered). *fl.* red, 4 in. to 5 in. in diameter, on pedicels 4 in. long. May. *l.* ovate, rather cordate, slightly acuminate. *h.* 30 ft. Porto Rico, 1827. In habit, this species resembles *T. populnea*.

**T. populnea** (Poplar-like). Mahoe; Portia-nut Oil-plant; Umbrella-tree. *fl.* at first yellow, with a purple central spot, but changing altogether to purple before they die off in the evening; pedicels 1½ in. to 2 in. long; peduncles equalling the petioles. June. *l.* roundish-cordate, acuminate, five to seven-nerved, covered beneath with dot-like scales. *h.* 40 ft. Tropics of Old World, 1770.

**T. p. guadalupensis** (Guadaloupe). *fl.*, petals narrower than in the type, fringed at base; pedicels lin. long. Cultivated in Guadaloupe.

**THEVETIA** (so called after Andr. Thevet, 1502-1590, a French monk, who travelled in Brazil and Guiana). *ORD. Apocynacæ*. A genus embracing about eight species of glabrous, stove, American shrubs or small trees, extending from Paraguay to Mexico. Flowers yellow, large, in terminal cymes; calyx five-parted, with acute, spreading segments; corolla funnel-shaped, the cylindrical tube abruptly expanded into a campanulate throat, the lobes broad and twisted; stamens inserted at the apex of the tube. Drupe broader than long. Leaves alternate, one-nerved or slenderly penniveined. Three species are known to cultivation. They thrive

**Thevetia**—continued.

in fibrous loam. Propagation may be effected by cuttings, inserted in sand, under a bell glass, in heat.

**T. Ahouai** (Ahouai). *fl.* pale yellow, on thick pedicels; corolla ribbed, with spreading lobes; pedicels thick, as long as the calyx; cymes terminal, contracted, many-flowered. June. *l.* oblong-ovate, acute, acuminate at base, 4in. long, highly glabrous above, sparsely pilose beneath. *h.* 20ft. Brazil, 1739. *SYN.* *Cerbera Ahouai* (A. B. R. 231; B. M. 737).

**T. nerifolia** (Oleander-leaved). Exile Oil Plant. *fl.* saffron-yellow, about 3in. long; calyx segments about half the length of the cylindrical part of the corolla, which is one-third the length of its enlarged throat; cymes sub-terminal, much shorter than the leaves, few or sometimes one-flowered. June. *l.* linear, glabrous, shining above, 3in. to 6in. long. *h.* 12ft. Tropical America and West Indies, 1735. *SYN.* *Cerbera Thevetia* (B. M. 2309).

**T. Yecotli** (Yecotli). *fl.* similar to those of *T. nerifolia*, 3in. long; corolla lobes three times the length of the tube; cymes sub-terminal, one to three-flowered. June. *fr.* green, warted, the size of a small apple. *l.* narrow-linear, acuminate at both ends, the margins revolute, glabrous above, slightly pilose beneath. *h.* 8ft. Mexico, 1800.

**THIBAUDIA** (named in honour of Thiebaut de Berneaud, Secretary of the Linnean Society of Paris, and a botanical writer). *ORD.* *Vacciniaceæ*. A genus to which only a couple of species are referred by Benthams and Hooker; they are very elegant, stove shrubs, natives of the Andes of New Grenada and Peru. Flowers scarlet, pedicellate, numerous, in axillary racemes; calyx tube continuous with the pedicel, terete, the limb short, obtusely five-lobed or five-toothed; corolla tubular, terete, the limb of five small, sub-erect lobes; stamens ten, as long as the corolla tube; pedicels bracteate at base, and sometimes bracteolate. Leaves alternate, persistent, petiolate or sub-sessile, coriaceous, penninerved, entire. The species thrive in a compost of turfy loam, peat, and sand. Cuttings will readily root in sand or soil, with or without the protection of a glass. Other species formerly included here will now be found under *Proclesia*, *Psammisia*, *Themistoclesia*, &c.

**T. floribunda** (bundle-flowered). *fl.* glabrous, on very long pedicels; racemes solitary, nearly 2in. long, with imbricated bracts at base. *l.* oblong-lanceolate, acuminate, reticulate-veined. Branches nearly terete, smooth, greyish. New Grenada.

**T. pichinchensis** (Pichinchan). *fl.* seven lines long; calyx furfuraceous-tomentose, the teeth mucronulate; corolla glabrous; racemes shorter than the leaves. *l.* very shortly petiolate, oval-oblong or sub-lanceolate, obtuse and acuminate, rounded at base, 3in. to 4in. long. *h.* 6ft. to 12ft. Pichincha, 1849.

**THICK-LEAF.** A common name for *Crassula* (which see).

**THIEBAUTIA.** A synonym of *Bletia* (which see).

**THIMBLEBERRY.** See *Rubus occidentalis*.

**THINNING-OUT.** A common term which refers to the work of reducing the number of seedlings of any description when they are too much crowded for the proper development of all. It should be attended to, amongst seedlings, at an early stage, if it is necessary at all, else the whole lot may become drawn, and thereby weakened. Thinning-out also applies to the cutting of shoots or branches—as, for instance, on fruit-trees—and to the reduction in quantity of various other subjects when the space is only available for a portion of the whole.

**THISTLE.** A common name for the species of *Carduus* and *Unicus*, and other plants.

**THISTLE, BLESSED.** See *Silybum Marianum*.

**THISTLE, COTTON.** See *Onopordon Acanthium*.

**THISTLE, GLOBE.** See *Echinops*.

**THISTLE, GOLDEN.** See *Scolymus hispanicus*.

**THISTLE, HEDGEHOG.** See *Echinocactus*.

**THISTLE, HOLY.** See *Silybum Marianum*.

**THISTLE, MELON.** See *Melocactus*.

**THISTLE, OUR LADY'S MILK.** See *Silybum Marianum*.

**THISTLE, SOW.** See *Sonchus*.

**THLADIANTHA** (from *thladias*, compressed, and *anthē*, a flower; owing, it is said, to the plant being first described from a pressed specimen!). *ORD.* *Cucurbitaceæ*. A genus including three or four species of climbing, greenhouse or hardy herbs, natives of North China, Java, and the Himalayas. Male flowers golden, rather large, solitary or racemose; calyx tube shortly campanulate, the bottom shut by a horizontal scale, the segments five, lanceolate; corolla campanulate, five-parted, the segments revolute about half-way down; filaments five. Female flowers solitary; calyx and corolla as in the males; ovary oblong; style deeply trifid, with three reniform stigmas. Fruit green, oblong, fleshy, many-ribbed. Leaves ovate-cordate, with a deep sinus, denticulate. *T. dubia*, the only species introduced, will thrive in almost any soil, but perhaps succeeds best when planted against a sunny wall.

**T. dubia** (doubtful).\* *fl.*, males approximate; calyx teeth very narrow; petals 3in. long; filaments minutely hairy; racemes 2in. to 3in. long, with prominent bracts; female peduncle 2in. to 3in. long, more or less hairy, the ovary densely woolly. *fr.* 1½in. by ¼in., glabrous, obtuse at both ends. *l.* deeply cordate-ovate, acute, undivided, 4in. by 2½in., denticulate, not angular, usually villous beneath; petioles 1in. to 1½in. long. Hardy. India and China, 1864. (B. H. 1872; 6; B. M. 5469; in both these figures, however, the female flower and fruit belong to another species.

**THLASPI** (probably from *Thlaspis*, the old Groek name for Cress, used by Dioscorides, from *thlas*, to bruise; its seeds being bruised as a condiment). Bastard Cress; Besom Weed; Penny Cress. *ORD.* *Cruciferae*. A genus comprising from twenty-five to thirty broadly-distributed species of annual or perennial, scapigerous herbs. Flowers white, pink, or pale purple, racemose. Radical leaves rosulate; cauline ones hastate-auriculate. None of the species are worth cultivating. *T. alpestre*, *T. arvense* (Boor's or Mithridate Mustard), and *T. perfoliatum* are British weeds.

**THOMASIA** (named in memory of Peter and Abraham Thomas, collectors of Swiss plants in the time of Haller). *ORD.* *Sterculiaceæ*. A genus comprising twenty-five species of very elegant, Australian, greenhouse shrubs, with the habit of *Lasiopetalum*, but with the leaves often lobed or cut. Flowers often tomentose; calyx usually purple, bluish, or white, five-lobed; petals none, or minute and scale-like; stamens five, alternate with the sepals, free or slightly connate at the base; bracts narrow, deciduous; bracteoles under the calyx three; racemes leaf-opposed, simple or rarely cymosely branched. Stipules leafy. The under-mentioned species are well worth cultivating in every collection. They thrive in a compost of loam, peat, and sand. Cuttings of the ripened wood will root freely in sand, under a glass.

**T. foliosa** (leafy). *fl.* small, on slender pedicels; petals none; racemes numerous, often branched, slender, hirsute. June. *l.* petiolate, ovate-cordate, deeply sinuate-lobed, rarely above 1in. long, sprinkled with stellate hairs above, more densely hirsute beneath. *h.* 3ft. 1823.

**T. glutinosa latifolia** (glutinous, broad-leaved). *fl.* pink, pretty, disposed in racemes; stamens, as well as a blotch at the base of the petals, dark brownish. Summer. *l.* stalked, cordate, acute, covered with stellate hairs. 1855. An attractive plant. (R. G. 1186.)

**T. grandiflora** (large-flowered). *fl.*, calyx red, spreading to about 1in. in diameter, not divided to the middle; petals none; racemes terminal. June. *l.* mostly ovate-lanceolate or oblong, or the lowest ovate, obtuse, ½in. to 1in. long, entire, cordate or obscurely three-lobed at base, glabrous or sprinkled with a few stellate hairs. *h.* 3ft. 1840.

**T. macrocarpa** (large-fruited).\* *fl.*, calyx red, opening to about 1in. in diameter, loosely woolly-hirsute outside; racemes tomentose-hirsute, few-flowered. June. *l.* broadly ovate-cordate,

**Thomasia**—*continued*.

obtuse, 1½ in. to 2 in. long, irregularly angular-toothed or shortly lobed, pubescent above when young, at length glabrous, tomentose beneath. *h.* 3 ft. or more. 1842. (B. M. 4111, under name of *T. stipulacea*.)

**T. purpurea** (purple). *fl.* rather small, on very short pedicels; calyx purple, about ½ in. in diameter; petals small, occasionally wanting; racemes longer than the leaves. June. *l.* oblong or nearly linear, obtuse, ½ in. to 1 in. long, entire, sprinkled with stellate hairs above, more hirsute beneath, or rarely nearly glabrous. *h.* 2 ft. 1803. SYN. *Lasiopetalum purpureum* (B. M. 1756).

**T. quercifolia** (Oak-leaved). *fl.* rather small; calyx purple, the lobes not reaching the middle, broad and obtuse; petals none; racemes simple. May. *l.* ovate, usually deeply three-lobed, the lateral lobes short, divaricate, and often obtusely three-lobed, the middle one longer, often three-lobed, the whole leaf rarely exceeding 1 in., sprinkled with stellate hairs above, rigidly hirsute beneath. *h.* 2 ft. 1803. SYN. *Lasiopetalum quercifolium* (A. B. R. 459; B. M. 1485).

**T. solanacea** (Solanum-like). *fl.*, calyx white, more or less tomentose, about ½ in. in diameter, divided to rather below the middle; petals usually wanting; racemes pedunculate, several-flowered, occasionally branched. June. *l.* deeply cordate-ovate, obtuse, mostly 1½ in. to 3 in. long, rather deeply sinuate-lobed, scabrous or hirsute above, softly and densely tomentose or hirsute beneath. *h.* 3 ft. and upwards. 1803. SYN. *Lasiopetalum solanaceum* (B. M. 1486).

**T. stipulacea** (prominent-stipuled). A synonym of *T. macrocarpa*.

**THOMSONIA** (named in honour of Dr. A. T. Thomson, author of "An Introduction to Botany"). SYN. *Pythonium*. ORD. *Aroidæ* (*Araceæ*). A genus including only a couple of species of stove, tuberous, perennial herbs, natives of the Himalaya and Khasya Mountains. Flowers monœcious, the males and females closely contiguous; spathe coriaceous, deciduous, oblong, boat-shaped, with an indistinct tube; spadix sessile, nearly equaling the spathe; peduncle elongated. Leaves long-petiole, triplicate; segments pinnatifid; pinnae oblong-lanceolate, acuminate. For culture, see **Caladium**.

**T. Hookeri** (Hooker's). *fl.*, female inflorescence rather shorter than the male; peduncle elongated, slender. *l.* seven-pedatisect; segments oblong-lanceolate, acuminate, cuneate-narrowed towards the base, distant, gradually becoming smaller; petiole elongated, slender, spotted. Tuber small. *h.* 2 ft. Churra, 1840.

**T. nepalensis** (Nepaul). *fl.*, spathe greenish, oblong-cymbiform, obtuse, coriaceous, thick; spadix green, the perfect male flowers purplish-yellow, the sterile ones yellow. *l.* trisected; middle segment pseudo-dichotomous, the partitions pinnatifid, the segments alternate, oblong-lanceolate, acuminate, cuneate at base, decurrent; nerves of the lateral segments numerous, spreading; petioles reddish below, irregularly spotted and mottled with fuscous-green. Tuber large. *h.* 2 ft. Nepaul, 1816.

**THORN**. A common name for various species of *Acacia*, *Cratægus*, &c.

**THORN**. The same as **Spine** (which see).

**THORN APPLE**. See **Datura Stramonium**.

**THORN BROOM**. See **Ulex europæus**.

**THORN, CHRIST'S**. See **Paliurus aculeatus** and **Zizyphus Spina-Christi**.

**THORN, GARLAND**. See **Paliurus aculeatus**.

**THORN, GOAT'S**. See **Astragalus Tragacantha**.

**THORN, JERUSALEM**. See **Parkinsonia aculeata**.

**THOUINIA** (named in honour of André Thouin, 1747-1824, Professor of Agriculture at Paris). SYNS. *Thyana*, *Vargasia*. ORD. *Sapindacæ*. A genus consisting of about a dozen species of stove, erect or climbing shrubs or trees, inhabiting tropical America. Flowers small or minute, racemose, cymose, or paniculate; calyx five-parted; petals four, five, or absent; stamens eight to ten. Leaves alternate, exstipulate, trifoliate or pinnate, rarely one-foliate. Only one species has been introduced. For culture, see **Ticorea**.

**Thouinia**—*continued*.

**T. pinnata** (pinnate-leaved). *fl.* white, disposed in terminal panicles, and having five petals and eight stamens. June. *l.* pinnate; leaflets oblong, slightly emarginate. *h.* 8 ft. St. Domingo, 1823. Erect.

**THOUSAND-LEGS**. A common name for **Millipedes** (which see).

**THREE BIRDS ORCHIS**. See **Pogonia pendula**.

**THREE FACES UNDER A HOOD**. See **Viola tricolor**.

**THRIFT**. See **Armeria**.

**THRINAX** (from *thrinax*, a fan; alluding to the form of the leaves). ORD. *Palmeæ*. A genus comprising about ten species of stove, mediocre or dwarf, unarmed Palms; one is a native of Florida, and the rest inhabit the Antilles. Flowers sometimes long and slender, pedicellate; spathes many, papery-coriaceous, cut; spadices elongated, the rachis clothed with a tubular sheath, the primary branches alternate, paniculate, the branchlets slender. Fruit small, pea-like. Leaves terminal, orbicular or truncate at base, flabellately plicate and multifid; segments induplicate bifid; petioles slender, biconvex. Trunks solitary or tufted, annulated below, above covered with the persistent bases of fallen leaves. The genus includes some very beautiful plants, the best-known of which are here described. They succeed best, when young, in a compost of loam, peat, and sand; as they get older, turfy loam and sand is preferable. Propagated by seeds, which, like all Palm seeds, should be obtained when freshly imported, sown in well-drained pots or pans of sandy loam, and plunged in bottom heat.

**T. argentea** (silvery). Broom Palm; Silver Thatch, &c. *fl.*, partial spathes three or four only; spadix 1 ft. long, slightly paniculate. *fr.* small. *l.* shorter than the petioles, silvery-silky beneath; divisions united at the base; ligule concave, somewhat crescent-shaped. Trunk 12 ft. to 15 ft. high, 2 in. to 3 in. thick. West Indies, 1830.

**T. barbadensis** (Barbados). *fl.*, spadix paniculate, 2 ft. long. *fr.* ½ in. in diameter. *l.* green, glabrous, very large, fan-shaped or digitate-multipartite; segments lanceolate, acuminate; petioles covered with a thick felt of small, white scales, and edged with black, hooked, ascending spines. Trunk 12 ft. high. Barbados, 1875.

**T. elegans** (elegant). A garden synonym of *T. radiata*.

**T. excelsa** (tall). *fl.*, spathe rusty-tomentose; spadix with spreading-recurved branches, its axis 1 ft. long, naked below. *fr.* globose, ½ in. in diameter. *l.* 4 ft. to 5 ft. long, pale green above, hoary-glaucous beneath by minute, appressed down, about fifty-cleft; divisions about 2 ft. long, 1 in. to 3 in. broad, united to about one-third their length. *h.* 7 ft. and upwards. Jamaica, 1800.

**T. gracilis** (slender). A garden synonym of *T. radiata*.

**T. graminifolia** (grass-leaved). A synonym of *T. multiflora*.

**T. multiflora** (many-flowered). *fl.*, primary spathes twelve to fifteen, tubular, obliquely opening, acute, longitudinally nerved; secondary spathes funnel-shaped, compressed at base; spadices erecto-patent. *l.* six to ten, erecto-patent, sub-orbicular, peltately radiate; segments forty or more, united half-way, the middle ones 2½ ft. to 3 ft. long, 2½ in. broad at base, the free part ensiform, long-acuminate, flat, acutely bifid at apex; sheaths 6 in. to 9 in. long. Caudex 6 ft. to 8 ft. high, 4 in. to 5 in. thick, deeply and irregularly annulate. Haiti. SYN. *T. graminifolia* (I. H. n. s. 187).

**T. parviflora** (small-flowered). *fl.*, perianth minute; spadix 2 ft. to 3 ft. long, paniculate. *fr.* dry, rather rough, ½ in. in diameter. *l.* puberulous, glabrate and green beneath, 10 in. to 2 ft. long; divisions united one-sixth to one-quarter their length; ligule deltoid. Trunk 10 ft. to 12 ft. high. Jamaica, 1778.

**T. pumilio** (dwarf). *l.* digitately multipartite; segments ensiform, acuminate, green on both sides, the middle nerve ferruginous-ramentaceous beneath, the secondary ones six to eight, impressed on both sides; ligule triangular. Trunk short or mediocre. Trinidad, 1830.

**T. radiata** (rayed). *fl.*, spadix 2 ft. to 3 ft. long, paniculate. *l.* green, glabrous or puberulous beneath, 1 ft. to 2 ft. long; divisions united to or beyond one-third their length; ligule broadly rounded, with a short, blunt appendage at the middle. Trunk short. Trinidad, 1838. See Fig. 23, p. 30. SYNS. *T. elegans* and *T. gracilis* (of gardens).

**THRINXIA.** Included under *Leontodon*.

**THRIPS** (a Greek word for a moth). The name given to a group of small insects that often do much harm to cultivated plants, by gnawing the surface of flowers and tender twigs and leaves, thus causing withered and distorted spots to appear on them. The genus *Thrips*, along with certain closely-related genera,

**Thrips—continued.**

development of the species of *Thrips* are much like the mature insects, save in colour (which is usually dull yellow), and in the wings being entirely absent from the larvæ, and represented only by short wing-cases in the pupæ. The structure just described renders the order intermediate between *Orthoptera* (to which Grass-

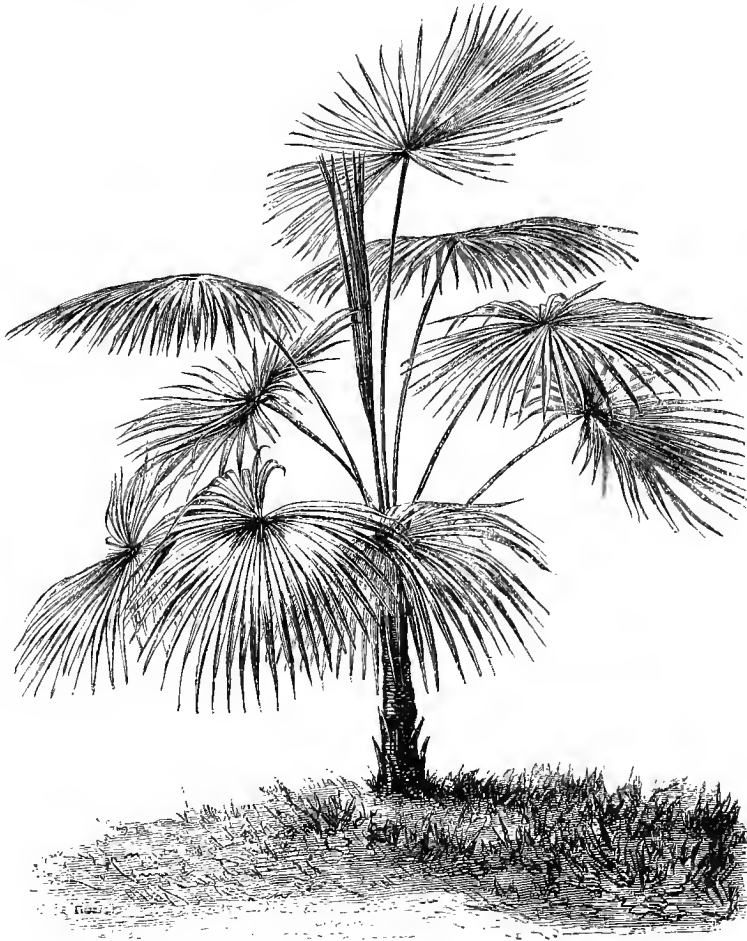


FIG. 23. *THRINAX RADIATA* (see page 29).

is ranked in a family known as the *Thysanoptera* (from *thysanoeis*, fringed, and *ptera*, wings), or as *Physopoda* (from *physis*, a bladder, and *poda*, feet). Both names allude to characteristic features in the structure of the fully-developed insects. Thrips are very common in flowers, crawling about the interior of the corolla tube, and over the stamens, or living upon or in the fruits, or on the lower surface of the leaves. They feed upon the more delicate parts of the plants, causing them to become withered and blighted. The mature insects are very small, and are black or dark-coloured. They are long and narrow, and are furnished with four straight, narrow wings, which are fringed with long hairs, and have few, if any, veins (see Fig. 24). They have three pairs of legs, on which the last joints end in a bladder-like swelling without claws. The mouth is provided with parts suited for piercing delicate tissues of plants, and for sucking their juices. The earlier stages in the de-

hoppers, Locusts, &c., belong) and *Hemiptera*. See **Insects.**

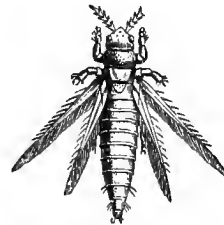


FIG. 24. *THRIPS* (magnified).

Many species have been described, so much alike as to render it very hard to distinguish them from each



**Thrips**—*continued*.

other; but gardeners do not require to spend time in determining their identity, as the habits of all are much alike, and the treatment is similar for all. The genera are distinguished chiefly by the presence or absence of veins in the wings, the hairy coating on the body, and differences of minor importance. One of the most hurtful kinds is *Heliothrips hamorrhoidalis* (P. H. Adonidium, Hal.), which injures plants in hothouses, as well as in winter gardens. The leaves become paler in colour, or turn black, and fall off. The young twigs also are frequently attacked and killed. This species is dark brown, with the tip of the body red-brown, and the eyes and limbs pale yellow. It is only about  $\frac{1}{10}$  in. long.

**Remedies.** Smoking the plants with tobacco, as for Apbides, or with insect-powder, washing them with infusion of tobacco, dipping them in soapy water, and keeping them for a time in the open air in summer, are methods that have been tried with success. There are no good remedies against the species of *Thrips* that feed on plants cultivated in the open air; but, fortunately, their attacks are seldom very hurtful to hardy plants. Choice subjects may be freed from their attacks by drawing the leaves between the finger and thumb, with sufficient pressure to crush the soft larvæ, but not to injure the leaves.

*T. Phylloxera* has been observed, in the United States of America, depositing eggs in the galls of *Phylloxera vastatrix* (see **Grape or Vine Louse**). The larvæ hatched from these eggs destroy multitudes of the *Phylloxera*.

**THRIXSPERMUM.** A synonym of *Sarcophilus* (which see).

**THROAT.** The orifice of a gamopetalous flower.

**THROAT-ROOT.** See *Campanula Cervicaria*.

**THROATWORT.** See *Trachelium*. The name is also applied to *Campanula Cervicaria* and *Digitalis purpurea*.

**THRUST-HOE.** Another name for the Dutch Hoe, a tool which the workman pushes from him when using



FIG. 25. THRUST-HOE.

it (see Fig. 25). It is well adapted for light work on a fairly even surface, and for hoeing flower-beds, &c., when it is necessary to loosen the surface, while standing upon the adjoining walk, instead of on the soil. See **Hoes and Hosing**.

**THRYALLIS** (the old Greek name used by Theophrastus for *Verbascum*; it means a wick, and was appropriate enough to the original plant, but not to the present). ORD. *Malpighiaceæ*. A small genus (three species) of stove, climbing, stellately hoary-pubescent, Brazilian shrubs. Flowers yellow; calyx five-parted, without glands; petals shortly clawed, glabrous, the limb fringed; stamens ten, all perfect; pedicels bibracteolate, articulated above the base; corymbs paniculate, axillary and terminal, effuse. Leaves opposite, entire, glabrous above, whitish beneath; petioles biglandular; stipules inconspicuous. Only one species is known in gardens. It thrives in a compost of loam and peat. Ripened cuttings will root in sand, under a hand glass, in heat.

**T. brachystachys** (short-spiked). *f.* disposed in short, paniculate racemes. August. *l.* ovate-lanceolate, glaucous-green above, white beneath. 1823. (B. R. 1162.)

**THRYPTOMENE** (from *thrypto*, to break or crush; in allusion to the humble, Heath-like aspect of the plant). ORD. *Myrtaceæ*. A genus comprising seventeen species

**Thryptomene**—*continued*.

of greenhouse, Heath-like, glabrous, Australian shrubs. Flowers small, axillary, solitary or rarely in twos or threes; calyx five-lobed, persistent; petals five, persistent, usually connivent over the stamens; stamens five or ten. Leaves opposite, small, entire. The only species introduced was formerly included under *Bæckeia* (which see for culture).

**T. saxicola** (rock-loving). *f.* white, on slender pedicels  $\frac{1}{2}$  in. long, in the upper axils. July. *l.* obovate-oblong, flat, obtuse or slightly acute,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, the midrib scarcely conspicuous. *h.* 3ft. to 4ft. (rarely diffuse or prostrate?). 1824. SYN. *Bæckeia saxicola* (B. M. 3160).

**THUJA.** See *Thuya*.

**THUNBERGIA** (named after of C. P. Thunberg, 1743-1822, a traveller in Batavia and Japan, and afterwards Professor at Upsala). Including *Heacacensis* and *Meyenia* (of Nees). ORD. *Acanthaceæ*. A genus embracing nearly thirty species of beautiful, stove, twining or dwarf and sub-erect, annual or perennial herbs, inhabiting South and tropical Africa, Madagascar, and the warmer parts of Asia. Flowers purple, blue, yellow, or white, shortly pedicellate, solitary in the axils, or disposed in terminal racemes; calyx annular, short, truncate or ten to fifteen-toothed; corolla conspicuous, the tube ventricose,

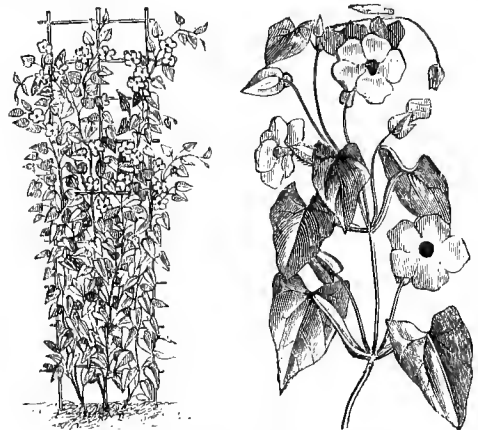


FIG. 26. THUNBERGIA ALATA, showing Habit and Portion of Flowering Branch.

curved, the limb oblique, of five rounded lobes, twisted to the left in bud; stamens four, didynamous near the base of the corolla tube; disk cushion-shaped or annular; bracts at the base of the pedicels leaf-like; bracteoles large, the margins coherent, at least when young. Capsule thickly coriaceous, suddenly narrowed into a sword-shaped beak. Leaves opposite, ovate, lanceolate, cordate, or hastate. The best-known species are here described; all are perennial, except where otherwise stated. Nearly all flower during the summer months, but some of the woody ones blossom in spring or late winter. The plants are of easy culture in any moderately good soil, but thrive best in a rich compost of fibrous loam and sand, to which may be added a small quantity of well-decayed manure. If the plants are grown in a brisk, moist, stove temperature, and the pots well drained, success is assured. Attention must be directed to pruning unsightly or bare shoots, before growth commences in spring, or else the plants will become straggling. Propagated by seeds, and also by cuttings of moderately firm young wood, placed in a propagating frame, with a temperature of from 65deg. to 70deg. *T. alata* and its varieties succeed under warm greenhouse treatment, and may readily be raised from

**Thunbergia**—continued.

seeds, sown in 5in. pots, in March or April. When large enough to pot off, the seedlings may be placed singly in other pots or in baskets, when they will soon grow into flowering specimens. A rather rich soil—loam and leaf mould or decayed manure, in the proportion of one part of the latter to two of the former—will suit admirably. In the young stages of growth, the plants should be subjected to stove treatment. When in flower, these *Thunbergias* are admirably adapted for edging groups, of plants along with other dwarf-growing subjects.

**T. alata** (winged).\* *fl.*, calyx twelve-cleft above the middle; corolla yellow, purple below, 1½in. long, the tube curved, the limb campanulate; stigma funnel-shaped, entire, ciliated. *l.* cordate-sagittate, acute, repand, with a rather broad sinus, the lobes diverging, acute or mucronate; petioles winged. South Africa, 1823. A softly silky-villous, caescent annual twiner. See Fig. 26. (B. M. 2591; H. E. F. 17.) There are a few varieties, of which the principal are: *alba* (B. M. 3512; P. M. B. ii. 2 and iii. 28; S. B. F. G. ser. ii. 392), with white, and *aurantiaca* (L. B. C. 1045; H. E. F. 177; B. v. 238), with deep yellow, flowers.

**T. a. Doddsii** (Dodds'). *fl.* yellowish-orange, with an eye of rich purplish-violet, large. *l.* irregularly bordered with white. (F. d. S. 415.)

**T. angulata** (angular). *fl.*, calyx twelve-parted; corolla pale blue with a yellow throat, 1in. long, the tube very short, the limb campanulate-infundibuliform, the segments rounded; bracteoles ovate, acuminate. *l.* on long petioles, cordate-sagittate, 1½in. long, ¾in. broad, with a deep sinus; segments truncate, slightly mucronate, long-acuminate. Madagascar, 1823. A scabrous-pubescent climber. (H. E. F. 166 and 177, f. 3; L. B. C. 1044.)

**T. capensis** (Cape). *fl.* yellow; calyx limb many-toothed; corolla tubular-campanulate. *l.* nearly round, slightly toothed, obtuse, very shortly petiolate, and, as well as the procumbent stems, hairy. Cape of Good Hope, 1824. Annual. (L. B. C. 1529.)

**T. chrysops** (golden-eyed). *fl.*, calyx slightly fleshy, truncate; corolla campanulate-infundibuliform, the tube yellow, much contracted at base, expanded above, the limb of a beautiful purple, with a blue ring; peduncles axillary, solitary, shorter than the petioles, one-flowered. *l.* cordate-angular, rather obtuse with a mucrone, slightly pubescent-scabrous. Stem slender, puberulous. *h.* 3ft. Sierra Leone. Annual. (B. M. 4119; F. d. S. i. 5; P. M. B. 221.)

**T. coccinea** (scarlet).\* *fl.*, calyx a minute rim; corolla varying from red to orange-rose, 1in. long, the lobes ½in. round; racemes 6in. to 18in. long, loose, pendent; bracts and bracteoles ½in. to 1in. long. Spring. *l.* 5in. to 8in. long, the lower ones ovate, the upper ones oblong, obtuse, cordate or angular at the base, acuminate, toothed; petioles ½in. to 2in. long, or wanting in the uppermost leaves. Pendent branches often 10ft. to 25ft. long. India, &c., 1823. A large, nearly glabrous climber. (B. M. 5124; F. d. S. 2447; H. E. F. 195; L. B. C. 1195.)

**T. erecta** (erect).\* *fl.* axillary, solitary; corolla dark blue, with a rich orange throat and pale yellow tube, four times the length of the bracts. July. *l.* opposite, ovate or oblong, smooth, dark green. *h.* 6ft. West Africa, 1857. A very continuous blossomer, producing flowers nearly throughout the whole year. SYN. *Meyenia erecta* (B. H. vii. 18; B. M. 5013; F. d. S. 1093; L. H. iii. 99; R. H. 1863, 251). The variety known as *alba* has white flowers with a yellow tube, but in other respects resembles the type.

**T. fragrans** (fragrant).\* *fl.*, calyx ½in. long, twelve to sixteen-toothed; corolla pure white, fragrant, 1½in. long; pedicels 1in. to 3in. long, one or rarely two in each axil; bracteoles ½in. long, broadly falcate-oblong. *l.* ovate or oblong, acute or obtuse, cordate or hastate at base, toothed, glabrous when mature, 2in. to 3in. long; petioles ½in. to 1in. long. Stem slender, climbing, retroversely hairy or glabrate. India, &c., 1796. (A. B. R. 125; F. M. 325; L. B. C. 1913.)

**T. f. laevis** (smooth). *fl.*, corolla not fragrant, the tube often greenish; pedicels often two in each axil, much thickened upwards in fruit. Plant glabrous or grey-puberulous. (B. M. 1881, under name of *T. fragrans*.)

**T. grandiflora** (large-flowered). *fl.*, calyx nearly entire; corolla blue, 2in. to 3in. long and broad; pedicels ½in. to 3in. long, opposite or fascicled; racemes usually stout, rarely slender and elongated, nearly glabrous; lower bracts often petioled, leaf-like. *l.* ovate, or the uppermost ones lanceolate, 6in. long, acute, cordate at base, toothed, often angularly lobed, pubescent, rarely glabrate; petioles 3in. long. India, &c., 1820. A large climber. (B. i. 76; B. M. 2366; B. R. 495; L. B. C. 324; P. M. B. vii. 221.)

**T. Harrisii** (Harris). A synonym of *T. laurifolia*.

**T. Hawtayneana** (Hawtayne's). *fl.* axillary; calyx a mere ring; corolla violet purple, with a yellowish tube, 1½in. long, nearly glabrous; pedicels short, solitary, with a tuft of hairs at their base; bracteoles ½in. to 1in. long, ovate-oblong. *l.* sessile, cordate-elliptic or cordate-ovate, acute, entire, 3in. long, 1½in. broad. Stem slender. India, &c., 1839. A handsome, nearly glabrous

**Thunbergia**—continued.

climber. SYN. *Meyenia Hawtayneana* (B. iv. 188; P. M. B. vi. 147).

**T. Kirkii** (Kirk's). *fl.* in short, two-flowered cymes; corolla 1½in. long, the lobes violet-blue, spreading, but not horizontally, broadly obovate, retuse. September. *l.* 1½in. to 3in. long, shortly petiolate, lanceolate, sub-acute or obtuse, entire or with each side dilated into an obtuse lobe. *h.* 2ft. to 3ft. Eastern Tropical Africa, 1876. Shrub. (B. M. 6677.)



FIG. 27. FLOWERING BRANCH OF *THUNBERGIA LAURIFOLIA*.

**T. laurifolia** (Laurel-leaved).\* *fl.* as in *T. grandiflora* (which this species closely resembles). *l.* elliptic or oblong, acuminate, sinuate or denticulate, palmately three-nerved. India, &c., 1856. Plant glabrous, or the new parts puberulous. Perennial. A tall climber. See Fig. 27. (B. M. 4985; L. H. 1857, 151; R. G. xiv. 475.) SYN. *T. Harrisii* (B. M. 4998; F. d. S. 1275; R. G. ix. 281).

**T. mysorensis** (Mysore). *fl.*, corolla 1½in. long, the mouth 2in. in diameter, the tube purplish, the limb yellow (in cultivation, sometimes with a red border, as in L. & P. F. G. iii. 881; pedicels ½in. to 1½in. long; racemes elongated, pendent; bracteoles 1in.

**Thunbergia**—continued.

long, falcate-elliptic, often coherent on one side, purplish-green. Spring. *l.* elliptic, acuminate, toothed, cuneate or rounded at base, 6 in. long, palmately three-nerved. Branches pendent. Mysore, 1854. An extensive climber. *SYN. Hexacentris myso-rensis* (B. M. 4786; F. d. S. 752, 942; L. J. F. iii. 285; R. (i. 280).

**T. natalensis** (Natal). *fl.* horizontally drooping, large, handsome; corolla tube yellow, 2 in. long, curved upwards; limb blue, large, the lobes obcordate, horizontally spreading; peduncles axillary, solitary, erect, single-flowered. July. *l.* opposite, the pairs rather approximate, sessile, ovate, acute or sub-acuminate, serrate-serrate, glabrous above, hairy on the midrib and veins beneath. Stem erect, 2 ft. or more high, shrubby below. Natal, 1857. (B. M. 5082.)

**T. Vogeliana** (Vogel's). *fl.* deep bluish-violet, with a yellow throat, about as large as those of *T. erecta*, but of greater substance. Summer. *l.* large, ovate or oblong, narrowed or rounded at base, dark green. Fernando Po, 1863. A handsome, erect-growing species. *SYN. Meyenia Vogeliana* (B. M. 5389).

**THUNIA.** Included under **Phaius** (which see).

**THUYA** (from *Thuia*, the old Greek name used by Theophrastus). Arbor-Vitæ. Sometimes spelt *Thuja*. Including *Biota*. *Chamaecyparis* is included, by Benthams and Hooker, under *Thuja*, but for garden purposes it is kept distinct in this work. ORD. *Coniferae*. A genus comprising about a dozen species of hardy, evergreen trees or shrubs, natives of North America and extra-tropical Eastern Asia. Flowers monœcious; males terminal, solitary; female catkins ovoid or oblong, rarely globose. Leaves small, opposite, scale-like, appressed, quadrifurcately imbricated, all sub-equal, or those on the flattened branchlets deeply keeled. Cones ovoid or oblong, rarely globose; mature ones rarely exceeding ½ in. in length. The species are readily raised from seeds, sown in spring, under glass, and the seedlings afterwards hardened off and planted out in the open ground. Cuttings, too, of half-ripened shoots, are easily struck; these may be put in heat, under bell glasses, or kept in a cool, shaded frame. About the middle of August is perhaps the best time for propagating without heat. Some of the variegated and other dwarf-growing forms are frequently grafted on seedling stocks of the common types.

**T. acuta** (acute). A synonym of *T. orientalis*.

**T. Doniana** (Don's). A synonym of *Libocedrus Doniana*.

**T. gigantea** (gigantic).\* White Cedar. *l.* in alternate, opposite pairs, closely imbricated; those on the branches more distant, decurrent, acute; those on the branchlets very flat, closely placed, irregularly imbricated in four rows, much shorter, more rounded, spiny-pointed. *cones* small, oval, tapering to both ends, nodding, solitary at the extremities of the smaller branchlets. Branches spreading, irregularly scattered; branchlets flattened, short, slender, flexible, undivided. *h.* 50 ft. to 150 ft. North-west America. A fine, graceful tree. See Fig. 28.

**T. g. atrovirens** (dark green). Branches spreading; branchlets open, broad, and flat. A fine, robust, very dark glossy-green variety.

**T. g. erecta** (erect). A much closer and more upright-growing kind than the type.

**T. g. pumila** (dwarf). A distinct variety, more diffuse in habit than the type, and much smaller in all its parts; the branchlets are also much closer-set, and of a brighter green.

**T. g. variegata** (variegated). A handsome, variegated variety, with a considerable portion of the branchlets pale yellow, distributed irregularly all over the plant.

**T. gigantea** (gigantic), of Carrière. A synonym of *Libocedrus decurrens*.

**T. latevirens** (pleasing green). A synonym of *Thuyopsis dolabrata latevirens*.

**T. occidentalis** (Western).\* American Arbor-Vitæ; White Cedar. *l.* very small, in opposite pairs, ovate-rhomboid, blunt-pointed, closely imbricated and flattened, thickly pressed along the branchlets in four rows; those on the older branches more distant, acute, decurrent, dull yellowish-green. *cones* obovate, ½ in. long, on short footstalks. Branches distant, horizontal, irregularly scattered along the stem; branchlets laterally spreading. *h.* 40 ft. to 50 ft. North America, 1596. A large bush or tree. Gordon, in "The Pinetum," enumerates the following varieties:

**T. o. alba** (white). Tips of the young branchlets silvery-white during spring and early summer.

**T. o. argentea** (silvery). Some of the branchlets in this variety are silvery-white.

**Thuya**—continued.

**T. o. aurea** (golden). A nice, golden, self-coloured variety, of American origin.

**T. o. compacta** (compact). Bagshot Park Arbor-Vitæ. A conical-shaped and very compact variety.

**T. o. cristata** (crested). Branchlets small, deep green, closely arranged, spreading, frequently recurved, cockscomb-shaped towards the ends of the branches.

**T. o. densa** (dense). *l.* regularly imbricated, ovate, compressed, glossy-green, quadrifurcous. Branches short, stout, compact; branchlets horizontal, flat, fan-shaped, of a rich, glossy colour.

**T. o. Elwangeriana** (Elwanger's).\* *l.* dimorphous, scale-like, and closely imbricated in four rows, or linear, acute, and spreading. Branches sub-erect; branchlets slender. A dwarf-growing, dense bush.

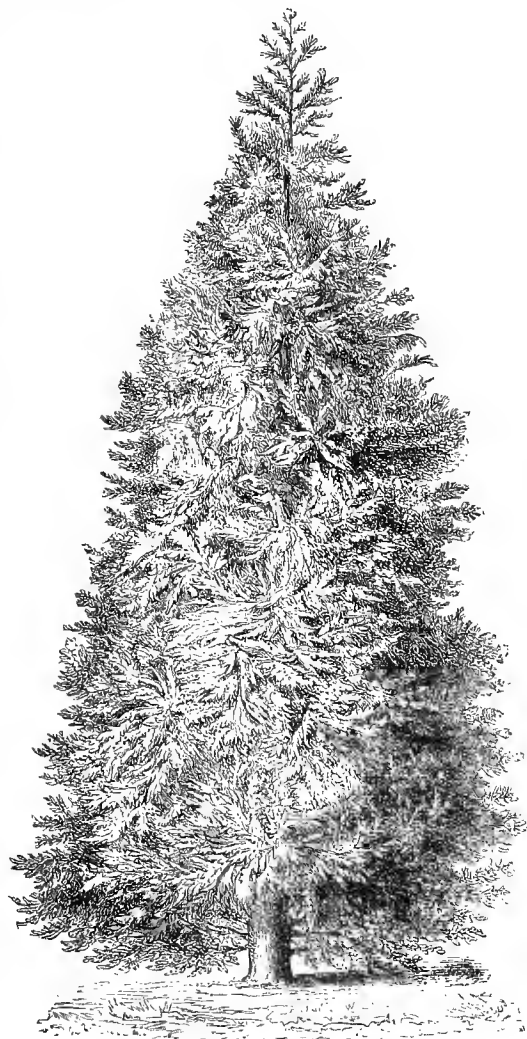


FIG. 28. THUYA GIGANTEA.

**T. o. globosa** (globular). A dwarf, dense, globular bush, resembling the type except in size.

**T. o. gracilis** (slender). Branches long and slender, drooping regularly on all sides; branchlets open, rather thinly placed, furnished with rather long, slender, bright green laterals. A distinct variety.

**T. o. Hoveyi** (Hovey's). *l.* ovate, bright green, closely imbricated. Branches numerous, flat. Spray strap-shaped. A round, compact bush.

**T. o. pendula** (pendulous). Principal branches along the main stem in a reverted position; branchlets more densely clustered or

**Thuya**—continued.

tufted towards the ends of the branches, and in a more declining position, than in the type.

**T. o. variegata** (variegated). Some of the branchlets in this variety are pale yellow.

**T. o. Vervaeana** (Vervae's).\* Belgian Variegated Arbor-Vitæ. A pretty, gold-tinted variety, with very slender branchlets.

**T. o. walthamensis** (Waltham Cross).\* A very fine, densely pyramidal bush, from 6ft. to 8ft. in height.

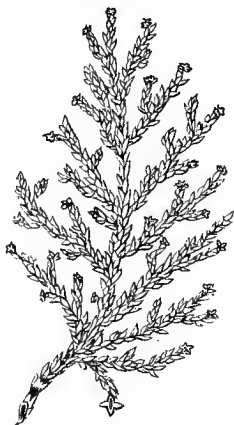


FIG. 29. BRANCHLET, WITH YOUNG CONES, OF THUYA ORIENTALIS.

**T. orientalis** (Eastern).\* Chinese Arbor-Vitæ. *l.* on the adult plant very small, in four rows, ovate-rhomboid, acute, imbricated, adpressed, decurrent, the outer or marginal one lapping over on both sides. *cones* ovate-elliptic, solitary at the ends of the small branchlets,  $\frac{1}{2}$  in. long, composed of six scales. Branches at first somewhat vertical and horizontal, finally fastigiate; branchlets two-rowed, densely crowded along the extremities of the branches. *h.* 18ft. to 20ft. China and Japan, 1860. A low tree or pyramidal

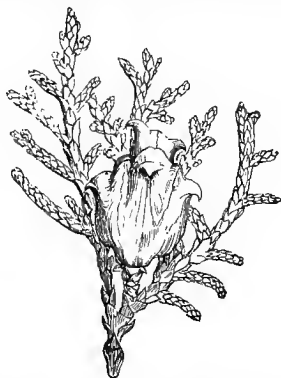


FIG. 30. BRANCHLET WITH ADULT CONE, OF THUYA ORIENTALIS.

bush. See Figs. 29 and 30. SYN. *T. acuta*. For general garden purposes the best name for this is *Biota orientalis*. Gordon mentions the following varieties, but regards *pendula* as a species:

**T. o. argentea** (silvery). This only differs from *variegata* in the white colour of a portion of its branchlets.

**T. o. ascotensis** (Ascot). A very nice, variegated form; a good portion of the upright branchlets are bright golden.

**T. o. athrotaxoides** (Athrotaxis-like). A dwarf, dense bush, with curiously-contorted branchlets.

**T. o. aurea** (golden). Branches short, slender, assuming during winter and spring a golden-yellow colour. A very neat, dwarf, dense bush, seldom exceeding 4ft. in height.

**T. o. elegantissima** (very elegant).\* Tips of the young shoots golden-yellow during summer and autumn. The best of the golden-tinted varieties.

**T. o. falcata** (sickle-shaped). *cones* large. A very upright and pyramidal form, admirably suited for forming edges, to which purpose it is put by the Japanese.

**Thuya**—continued.

**T. o. funiculata** (rope-like). *l.* small, open, acute. Branchlets slender, little-divided, bright green, thinly furnished with leaves. Said to be a hybrid between the type and *T. o. pendula*.

**T. o. glauca** (glaucous). *l.* (as well as the branchlets) covered with a fine, glaucous powder, imparting a beautiful silvery appearance to the plant.

**T. o. gracilis** (slender). This differs from the type in being much slenderer, more compact and erect in all its parts, and in having much smaller and more acute leaves. Nepal.

**T. o. macrocarpa** (large-fruited). Branches drooping, slender; branchlets rather distant, alternate, flattened, regularly furnished laterally with small, bright green spray. A dwarf, loose-growing form, supposed to bear somewhat larger cones than the type.

**T. o. monstrosa** (monstrous). *l.* thickened, ovate, obtuse, rarely acute. Branchlets few, short, gross, much contorted, often four-sided.

**T. o. pkinensis** (Pekin). *l.* very small, the marginal ones lapping over on both sides. *cones* small, globular,  $\frac{1}{2}$  in. in diameter, mostly consisting of eight scales. Branches rather long and somewhat spreading; branchlets slender. *h.* 50ft. to 60ft. Pekin, 1861. A splendid tree.

**T. o. pendula** (pendulous). Weeping Arbor-Vitæ. *l.* in opposite pairs, very small, rather distant, scale-like or ovate-lanceolate, loosely imbricated. *cones* globose or ovate-oblong. Branches spreading, slender, very long, recurved; branchlets thread-like, sometimes forked, loosely drooping. *h.* 10ft. to 15ft. Japan. SYN. *Biota pendula*.

**T. o. pyramidalis** (pyramidal). A fine variety, with a tall, narrow, fastigiate head; the leaves and branches are more robust than in the type. *h.* 20ft. to 30ft.

**T. o. semper-aureoens** (always golden). This desirable form resembles *T. o. aurea*, but retains its golden hue throughout the year.

**T. o. Sieboldii** (Siebold's). Branchlets short, numerous, bright green. Head dwarf, compact, conical.

**T. o. triangularis** (triangular). Branchlets arranged in a triangular manner, not flat or fan-shaped, as is usually the case.

**T. o. variegata** (variegated). A very effective variety, the branchlets being bright golden and green, equally intermixed all over the plant.

**T. o. Zuccariniana** (Zuccarini's). A nice, compact, dwarf variety, globular in form, and bright green, which colour it retains throughout the winter.

**T. plicata** (folded). *l.* on adult plants ovate, blunt-pointed, regularly imbricated in four rows, quite flat, smooth, bright green above, dull glaucous-green beneath; those on the young plants very much pointed. *cones* small, solitary, nodding, scattered, ovate-oblong. Branches horizontal, rather short, spreading, scattered; branchlets long, straight, linear, regularly pointed. *h.* 20ft. Nootka Sound, 1796. Tree.

**T. p. minima** (smallest). A compact, miniature variety. Its annual growth does not exceed  $\frac{1}{2}$  in.

**T. p. variegata** (variegated). This differs from the type in having a portion of its leaves and lesser spray of a pale yellow, intermixed all over the plant in a variegated manner.

**T. Standishi** (Standish's). *l.* ovate, blunt-pointed, in opposite pairs, closely imbricated in four rows along the branchlets, deep glossy-green above, dull glaucous-white below. *cones* small, composed of valvate scales. Branches scattered, distantly placed, spreading; branchlets and smaller spray flat, alternate, two-edged, quite straight. Japan, 1861. Tree.

**T. tatarica** (Tartarian). *l.* in opposite, alternate pairs, closely imbricated in four rows, bluntly oval, somewhat flattened. *cones* similar to those of *T. occidentalis*. Branches thickly set, somewhat horizontal, rather flat, dense, compact, fan-shaped, thickly placed in two horizontal rows along the lesser spray. *h.* 8ft. to 10ft. A dense, conical bush, of garden origin. SYN. *T. Wareana*.

**T. tetragona** (tetragonal). A synonym of *Libocedrus tetragona*.

**T. Wareana** (Ware's). A synonym of *T. tatarica*.

**THUYOPSIS** (from *Thuya*, and *opsis*, resemblance; referring to the affinity of the genus). ORD. *Conifere*. A monotypic genus. The species—a tall, hardy, evergreen tree—is included, by the authors of the "Genera Plantarum," under *Thuya* (which see for culture).

**T. dolabrata** (hatchet-leaved).\* *l.* in four rows, scale-like, decussate, broad, thick, ovate, rounded at the points, imbricated, furrowed along the middle, deep shining-green above, silvery-white beneath. *cones* small, ovate, sessile, squarrose, consisting of eight to ten woody scales. Branches vertical, open, pendulous at the ends; branchlets two-edged, very numerous, alternate. *h.* 40ft. to 50ft. Japan. Tree. See Fig. 31.

**T. d. latevirens** (pleasing green). *l.* (as well as the branchlets) light shining green, very small. A very neat, erect, dense

**Thuyopsis**—continued.

bush, seldom exceeding from 4ft. to 5ft. in height. SYN. *Thuya latevirens*.

**T. d. variegata** (variegated). This form has a portion of its lesser spray and leaves of a pale yellow colour.

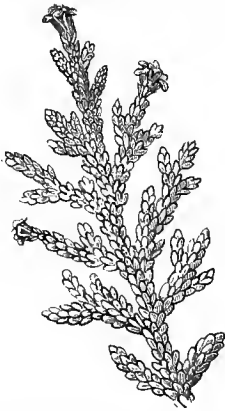


FIG. 31. BRANCHLET, WITH YOUNG CONES, OF THUYOPSIS DOLABRATA.

**THYANA.** A synonym of **Thouinia** (which see).

**THYLACANTHA.** A synonym of **Angelonia** (which see).

**THYLACOPTERIS.** Included under *Polypodium*.

**THYMRA** (the old Greek name used by Dioscorides for Savory). ORD. *Labiata*. A monotypic genus. The species is a hardy, suffruticose, rockwork plant, with the habit of *Thymus*. It thrives in sandy, gravelly loam, and requires the protection of a pit in winter. It may be multiplied by seeds, sown in April; or by cuttings, inserted under a handlight, in June.

**T. spicata** (spike-flowered). *fl.* pale purple; corolla tube exserted; whorls six to ten-flowered, in a short, dense spike or clustered head; bracts ovate or lanceolate, often coloured. June and July. *l.* linear, entire; those of the sterile branches small, obtuse, sub-decussate; those of the fertile ones nearly lin. long, acute. Branches ascending, 6in. to 12in. long, scarcely pubescent. Mediterranean region, 1695. (S. F. G. 546.)

**THYME** (*Thymus*). There are two species of *Thymus* cultivated in gardens, namely Common Thyme (*T. vulgaris*) and Lemon Thyme (*T. Serpyllum vulgaris*), for the leaves and tops, which are in constant demand for culinary purposes, the aromatic flavour being generally liked. Thyme is often used as an edging for some part of the kitchen garden, a purpose for which it is admirably adapted until the plants are about three or four years old, when they require to be replaced. Propagation is easily effected by seeds, sown in April, either on a warm border, with a view to transplanting afterwards, or in drills where the plants are intended to form an edging. In either case, a space of 4in. or 6in. should be allowed between every two plants. Division is also a ready method of propagation; it should be done in March or April. The branches will also root readily into the ground, and form plants, if they are covered with a little soil; this is the best way of increasing a stock of Lemon Thyme. A light, rather dry soil, and warm situation, is most preferable for Thyme plants. A stock of branches should be cut when the plants are coming into flower, and suspended in a cool place for using in a dry state.

**THYME, BASIL.** See **Calamintha Acinos**.

**THYME, CAT.** A common name for *Teucrium Marum* and *T. Polium*.

**THYMELEA** (from *Thymos*, Thyme, and *Elai*, the Olive; in allusion to the Thyme-like foliage and the small, Olive-like fruit). ORD. *Thymelæaceæ*. A genus

**Thymelæa**—continued.

comprising about a score species of hardy or half-hardy, perennial or rarely annual herbs, sub-shrubs, or small shrubs, mostly inhabiting the Eastern Mediterranean region, but extending as far as the Canary Islands and Persia, a few being also found in Central Asia and Europe. Flowers small, sessile in the axils, fascicled or solitary, hermaphrodite or by abortion polygamous; perianth urceolate or rarely (especially in the male flowers) with a slender, cylindrical tube, the lobes four, spreading; stamens eight, on very short filaments; bracts small. Leaves scattered, often small or narrow. The two best-known species are here described. Both thrive in a compost of equal parts loam and peat. Propagation may be effected by cuttings. Matured shoots or side growths should be selected, in autumn, inserted thinly in well-drained pots of peaty soil, and covered with a bell glass. If kept in a cool house in winter, they will callus, and may, early in spring, be introduced to gentle heat, to encourage growth and the emission of roots. The young plants may then be potted singly, and grown on in a close, but not high, temperature, and afterwards hardened and kept quite cool during the following autumn and winter, in order to thoroughly ripen the wood.

**T. hirsuta** (hairy). *fl.* white; fascicles axillary or terminal, few-flowered, equalling the leaves. July. *l.* coriaceous, ovate, nearly round, or oblong, obtuse, nerveless, two to three lines long, glabrous above, white-tomentose beneath. Stems 1ft. to 2ft. long, slender, fastigate-branched. Mediterranean region, 1759. A decumbent, greenhouse or half-hardy shrub. SYN. *Passerina hirsuta* (B. M. 1949; S. F. G. 360).

**T. Tartonraira** (Tartonraira). *fl.* white, copious, two to five glomerate in the upper axils; bracteoles whitish. June. *l.* coriaceous, obovate or obovate-oblong, nerved, imbricated, five to ten lines long. Branches copious, divaricate, rigid. South Europe, &c., 1640. A small, hardy shrub, wholly silky-canescens, whitish or fulvous. SYNS. *Daphne Tartonraira*, *Passerina Tartonraira* (S. F. G. 354).

**THYMELEACEÆ.** A natural order of trees or shrubs, very rarely slender, annual herbs, broadly dispersed. Flowers hermaphrodite, or by abortion polygamous or dioecious, regular, capitate or shortly racemose or spicate, rarely solitary; perianth inferior, petaloid or rarely herbaceous; lobes or segments four or five, imbricated in æstivation, simple, or the two inner ones rarely rather smaller; scales equalling, or often twice or rarely thrice as many as, the lobes; stamens as many, or twice as many, as the lobes; filaments filiform, short; hypogynous disk annular, cup-shaped; ovary sessile or shortly stipitate; bracts variable. Fruit nearly always indehiscent, a nut, berry, or drupe. Leaves opposite, or often alternate or scattered, entire, sometimes numerous and small, sometimes ample; stipules absent. The order includes about thirty-eight genera and 360 species. Examples: *Daphne*, *Gnidia*, *Lagetta*, *Phaleria*, *Pimelea*.

**THYME, WATER.** See **Elodea**.

**THYMUS** (from *Thymos*, the old Greek name used by Theophrastus for this plant or for Savory). Thyme. ORD. *Labiata*. A genus of mostly hardy, small shrubs or under-shrubs, inhabiting Northern temperate regions, but mostly found in the neighbourhood of the Mediterranean. The number of species is variously estimated by different authors as between forty and eighty. Calyx ovoid, ten to thirteen-nerved, bilabiate, the upper lip three-toothed, the lower bifid; corolla tube naked within, the limb obscurely bilabiate, the upper lip straight and notched, the lower one trifid; stamens four, usually exserted; whorls often few-flowered, distant and axillary or spicate. Leaves small, entire; floral ones conformed, or changed to bracts on the spikes. The species are not possessed of much beauty. They are of simple culture in ordinary soil. Increased by divisions, by slips, by cuttings, or by seeds, sown in March or April. Other species formerly included here will be found under **Calamintha**.

**Thymus**—continued.

**T. Chamædrys** (Chamædrys). *fl.* light purple, sub-capitate, generally with several separate whorls beneath the terminal head. Summer and autumn. *l.* oval, elliptic-oval, or oblong-elliptical, generally rather abruptly contracted into the petiole. Stems wiry, ascending, slightly branched. Europe (Britain), &c. (Sy. En. B. 1044.)

**T. C. languinus** (woolly). A pretty form in which the leaves and young shoots are clothed with long, woolly hairs.

**T. C. montanus** (mountain-loving). *l.* larger than in the species. Branchlets longer and more erect. (B. M. 2666, under name of *T. nummularius*.)

**T. citriodorus** (Lemon-scented). A synonym of *T. Serpyllum vulgare*.

**T. nummularius** (Moneywort-like). A synonym of *T. Chamædrys montanus*.

**T. Serpyllum** (Serpyllum). Brotherwort; Wild Thyme. *fl.* rose-purple,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, on very short pedicels; whorls capitate; bracts leafy. June to August. *l.* green, flat, quite entire,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. Stems decumbent. Rootstock woody. Europe (Britain), &c. (Sy. En. B. 1043.)

**T. S. vulgaris** (common). Lemon Thyme. *l.* smaller, with very prominent veins. This is sometimes called *T. citriodorus*. See also **Thyme**.

**T. striatus** (striated). *fl.* calyx teeth rigid, pungent; whorls closely approximating in an oblong head. *l.* sub-sessile, linear, rigid, narrowed at base, glabrous, ciliated; floral ones broadly cordate-ovate, striated, pubescent. Floriferous branches ascending. Greece. Half-hardy, procumbent shrub. SYN. *T. Zygis* (S. F. G. 574).

**T. vulgaris** (common). Garden Thyme. *fl.* resembling those of *T. Serpyllum*, but often smaller. June. *l.* sessile,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, linear, or ovate-lanceolate, acute, the margins revolute.  $\frac{1}{2}$  in. South Europe, 1548. (B. M. Pl. 205.) For culture, &c., see **Thyme**.

**T. Zygis** (Zygis). A synonym of *T. striatus*.

**THYRSACANTHUS** (from *thyrsos*, a thyrses, and *Acanthus*, in allusion to the form of inflorescence). Thyrses Flower. SYN. *Odontonema*. ORD. *Acanthaceae*. A genus comprising about a score species of stove, erect herbs or shrubs, natives of tropical America. Flowers red, fascicled in the axils of the bracts, pedicellate; calyx short, somewhat five-parted; corolla tube elongated; limb sub-bilabiate, four-cleft; stamens two, affixed above the middle of the tube; fascicles or cymes disposed in a thyrses. Leaves opposite, entire, often large. The species known to cultivation are described below. They thrive in a compost of about equal parts of loam and leaf soil. Propagated by cuttings, inserted, preferably in single pots, in spring, and placed in a close, warm frame. Young plants should be pinched, to encourage a bushy growth. Some of them may be cultivated in frames during the summer, but require a stove temperature in winter.

**T. barlerioides** (Barleria-like). *fl.*, corolla lin. to  $\frac{1}{2}$  in. long, glabrous, the lobes ovate, obtuse; thyrses sub-sessile, composed of approximate whorls, 2 in. to 7 in. long, many-flowered, dense, interrupted at base; bracts  $\frac{1}{2}$  in. long, subulate-acuminate. *l.*  $\frac{1}{2}$  in. to 9 in. long,  $\frac{1}{2}$  in. to 3 in. broad, sessile, shortly attenuated at apex, argutely acuminate, terminal. Stem erect, succulent. Minas Geraes. A pubescent perennial. (F. d. S. 986.)

**T. bracteolatus** (bracteolate).\* *fl.*, corolla  $\frac{1}{2}$  in. long, pubescent-viscidulous, the upper lip bifid; thyrses pubescent, terminal, narrow; bracts lanceolate-subulate; bracteoles subulate; lower peduncles three or many-flowered, upper ones one-flowered. July and August. *l.* oblong-lanceolate, long-acuminate, shortly petiolate, glabrous, shining, subulate,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, lin. to 2 in. broad. Branches acutely tetragonal. *h.* 2 ft. New Grenada, 1823. Shrub. (B. M. 4441.)

**T. callistachyus** (beautiful-spiked).\* *fl.*, sepals pubescent, bristly-acuminate; corolla glabrous, the segments glandular within; upper lip bilobed, the lower one much deflexed; inflorescence straight, naked, the axis tomentose. July and August. *l.* oblong, petiolate, wrinkled, acute, below (as well as the branches) tomentose. Mexico. *h.* 2 ft. Shrub. (L. J. F. 165; L. & P. F. G. ii. 53; R. G. 1054.) SYNS. *T. lilacinus*, *Justicia lilacina* (of gardens).

**T. indicus** (Indian). *fl.*, calyx deeply five-cleft, the segments erect; corolla white, with a few purple lines, funnel-shaped, the mouth oblique, the limb obscurely bilabiate, the segments spreading-reflexed; thyrses terminal. April. *l.* opposite, about  $\frac{1}{2}$  in. long, oblong-lanceolate, pinnate-veined, acuminate, entire, dark green, gradually tapering at base into a short petiole. Stem and branches tetragonal. *h.* 2 ft. Bhotan, 1857. Shrub. (B. M. 5062.) The correct name of this plant is *Asystasia bengalensis*.

**Thyrsacanthus**—continued.

**T. Lemaireanus** (Lemaire's). A synonym of *T. strictus*.

**T. lilacinus** (Lilac-flowered). A synonym of *T. callistachyus*.

**T. nitidus** (shining). *fl.*, corolla  $\frac{1}{2}$  in. long, slightly bilabiate; lobes drooping, sub-equal, oblong, rather blunt, about as long as the tube; fascicles somewhat distant; raceme compound at the base. *l.* oblong or lanceolate-oblong, acuminate,  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long, tapering into the short petioles. *h.* 3 ft. to 4 ft. West Indies. Shrub. SYN. *Justicia nitida* (A. B. R. 570).

**T. rutilans** (reddish).\* *fl.* solitary in the axils of the bracts; corolla tubular-ventricose, the lobes sub-equal, erose; raceme terminal, axillary,  $\frac{1}{2}$  in. to 1 in. long, twelve to sixteen-flowered, nodding. Winter and spring. *l.* sessile, oblong-lanceolate, acuminate, acute, narrowed at base, obsoletely erose-denticulate on the margins, paler beneath, sparsely pilose on both sides. *h.* 2 ft. Columbia, 1851. Shrub.

**T. rutilans** (reddish), of gardens. A synonym of *T. Schomburgkianus*.

**T. Schomburgkianus** (Schomburgk's).\* *fl.* brilliant crimson, distant, opposite; corolla lin. long, with a nearly regular limb, the segments ovate, scarcely spreading; raceme terminal, elongated, long-pedunculate, glandular-pubescent. Winter and spring. *l.* oval-oblong, cuspidate-acuminate,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long. Branches sub-tetragonal, with smooth angles. *h.* 3 ft. New Grenada, 1855. Shrub. (B. M. 4851.) SYN. *T. rutilans* (B. H. 1865, p. 97; F. d. S. 752; L. & P. F. G. iii. p. 75).

**T. strictus** (straight). *fl.* all fascicled; corolla nearly lin. long, with an oblique, nearly regular limb, the segments oblong, acute; whorls approximate, adpressed; thyrses terminal, elongated, straight, simple, narrow, 1 ft. long; bracts subulate, nearly equaling the pedicels. February and March. *l.* oblong, acuminate, acute at base, shortly attenuated into the petioles. Stem simple, elongated. *h.* 3 ft. Honduras, 1840. A glabrous shrub. (B. M. 4378.) SYNS. *T. Lemaireanus*, *Aphelandra longiscapa* (of gardens), *Eranthemum coccineum* (F. d. S. 240), *Justicia longiracemosa* (of gardens), *Salpingantha coccinea* (of gardens).

**THYRSANTHUS**. A synonym of **Wistaria** (which see).

**THYRSE**. A panicle whose principal diameter is midway between the base and apex.

**THYRSE FLOWER**. See **Thyrsacanthus**.

**THYRSOID**. Resembling a thyrses.

**THYRSOPTERIS** (from *thyrsos*, a bunch or raceme, and *Pteris*, a Fern; the fructification is disposed in racemose bunches). ORD. *Filices*. A monotypic genus. The species is a handsome, but very rare, greenhouse Fern. For general culture, see **Ferns**.

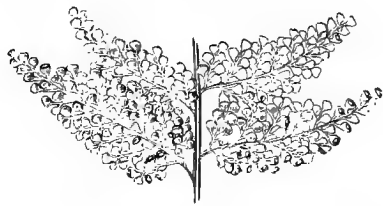


FIG. 32. PORTION OF FERTILE FROND OF THYRSOPTERIS ELEGANS.

**T. elegans** (elegant). *cau.* arborescent. *fronds* decomposed, attaining a length of 5 ft. to 6 ft., one-third of which is naked; sterile portions bipinnate, with lanceolate, incised pinnules; fertile parts tripinnate, each pinna becoming a raceme of stalked involucres, *sori* globose; involucre cup-shaped. *h.* 15 ft. Juan Fernandez, 1854. See Fig. 32.

**THYRSULA**. The little cyme borne by the majority of the *Labiata* in the axils of their leaves.

**THYSANOTUS** (from *thysanotos*, fringed; alluding to the three elegantly-fringed inner perianth segments). Fringed Violet; Fringe Lily. SYN. *Chlamysporum*. Including *Isandra*. ORD. *Liliaceae*. A genus including nineteen species of greenhouse perennials, all Australian, one extending to the Philippine Islands and South China. Flowers umbellate, rarely solitary; perianth marcescent, persistent, of six segments, the outer ones narrow, the inner ones with broad, coloured margins,



**Thysanotus**—continued.

and fringed on the edges; stamens six, or sometimes three; bracts short, imbricated; scapes leafless or nearly so, simple or variously branched. Leaves radical, grass-like. The following species have been introduced, and are very elegant subjects when in flower. They thrive in sandy loam, and may be increased by offsets.

**T. dichotomus** (dichotomously branched). *fl.* one, two, or rarely three, in terminal umbels; perianth segments purple; stamens six. July. *l.* radical ones few, short, withering early. Stems very variable, sometimes erect, branched, 1ft. to 2ft. high, rarely almost twining. Rhizome thick, fibrous. 1838. (B. R. 1840, 14, under name of *T. intricatus*.) *T. tenuis* is probably a reduced form of this species. (B. R. 1838, 50.)

**T. elatior** (tall). A form of *T. tuberosus*.

**T. intricatus** (intricate). A synonym of *T. dichotomus*.

**T. isantherus** (even-anthered). A synonym of *T. tuberosus*.

**T. junceus** (Rush-like).\* *fl.* one to three in terminal umbels, and sometimes one or two sessile along the lower branches; perianth segments purple, five to six lines long; stamens six. August. *l.* radical ones few, narrow-linear, short, soon withering. Stems slender, loosely branched, erect or flexuous, 1ft. to 2ft. high, bearing sometimes a short leaf near the base. Rhizome thick, fibrous. 1804. (B. M. 2351; B. R. 656.)

**T. multiflorus** (many-flowered). *fl.* perianth segments purple, the outer ones very acute, the inner ones rather shorter; stamens three; scapes simple, 6in. to 18in. high, bearing a single, terminal, many-flowered umbel or rarely a second one lower down. August. *l.* all radical, densely tufted, erect, rigid, much shorter than the scape. Stock densely tufted, with fibrous roots.

**T. m. prolifer** (proliferous). A luxuriant form, having a large, terminal umbel, frequently a second one rather lower down, and leaves sometimes exceeding the scape. (B. R. 1838, 8, and F. d. S. 1911, under name of *T. proliferus*.)

**T. proliferus** (proliferous). A synonym of *T. multiflorus prolifer*.

**T. tenuis**. See *T. dichotomus*.

**T. tuberosus** (tuberous-rooted).\* *fl.* perianth purple, sometimes six to seven lines long; stamens six; scape erect, rigid, terete, 6in. to over 12in. high, branching into a loose, irregularly dichotomous panicle, each branch having a terminal umbel of one to four flowers, and sometimes a lateral, sessile one. June. *l.* radical, not numerous, narrow-linear, very short or as long as the scape. Fibrous roots swollen into tubers. 1825. (B. R. 655, under name of *T. isantherus*.) *T. elatior* is a tall, strong, many-flowered form of this species.

**Tiarella**—continued.

racemes terminal. Leaves mostly radical, long-stalked, simple or trifoliate; stipules small, adnate with the petioles. *T. cordifolia* is the best-known species. It thrives in ordinary soil, and is well suited for rockwork, or for the front of the flower border. Increased by divisions.

**T. cordifolia** (heart-shape-leaved).\* False Mitrewort. *fl.* white; petals oblong, clawed; raceme simple; scapes 6in. to 12in. high. April. *l.* cordate, acutely lobed, unequally mucronate-toothed, hirsute above, pubescent beneath. Stem thick, sending out creeping stolons after flowering. North America, 1731. See Fig. 33. (B. M. 1589.)

**T. Menziesii** (Menzies'). A synonym of *Tolmiea Menziesii*.

**TIARIDIUM**. Included under *Heliotropium*.

**TIBOUCHINA**. Included under *Pleroma*.

**TICKLE MY FANCY**. See *Viola tricolor*.

**TICKS**. These belong to the same group as Mites, viz., the *Acarida*, and are not insects, in the strict sense, at all. They are fairly numerous, and have been placed under several genera, included in the family *Ixodidae*, which takes its name from the chief genus, *Ixodes*. To this genus almost all the British Ticks belong. They all live in woods and thickets, or upon low herbage, apparently feeding, for a time at least, on the juices of plants; but all Ticks seek to attach themselves to the bodies of passing animals; and, once attached, they bury their proboscis in the animal's skin, and live there for the rest of their lives, unless dislodged, sucking blood, and growing rapidly. It has been supposed that each species is parasitic upon a single species of animal; but though each usually shows a preference for some one species of host, they are able to subsist on others also, and all animals, from man downwards, are liable to their attacks. Dogs are peculiarly troubled with them; and in Britain, the one known as the Dog-tick (*I. erinaceus*) is common on dogs, cattle, &c.

In general appearance, Ticks are much alike, all being covered by a tough skin, with no division into segments. They are usually ovate or elliptical in form; each of their eight legs ends in a sucker and two claws, giving a firm grasp; and the head bears a barbed snout, which, once buried under the skin, cannot be withdrawn. The palpi, or feelers, at the sides of the mouth, contain two tubes for sucking in the fluid food. Some Ticks have eyes, others have none. Each bears a small, horny shield on the back, behind the head. The largest species, when full of blood, may become as large as a common bean; but few reach this size.

Ticks sometimes cause much annoyance to gardeners in autumn, by fixing themselves to the skin, in the manner described above. They can be got rid of by washing the affected parts with an infusion of tobacco, which stupefies them, and weakens their hold on the skin, so that they can be readily removed. If Ticks are carelessly pulled off, the head and fore limbs are often left in the wound, and are apt to cause annoying sores, if not removed at once.

**TICOREA** (the name of *T. fetida* in Guiana). SYNS. *Ozophyllum*, *Sciuris*. ORD. *Rutaceæ*. A genus embracing about half-a-score species of stove trees or shrubs, natives of Brazil and Guiana. Flowers white, yellowish-white, or scarlet, on bracteate pedicels; calyx short, four or five-lobed; corolla tubular-infundibular, the tube elongated, the limb of five valvate lobes; disk cup-like or urceolate; stamens five to eight; paucies or cymes terminating the branchlets, rarely axillary, leafless. Leaves opposite or alternate, simple or consisting of one to three entire, pellucid-dotted leaflets. Two species have been introduced. They thrive in a compost of peat, loam, and sand. Propagation may be effected by ripened cuttings, inserted in sand, under a glass, in heat.



FIG. 33. TIARELLA CORDIFOLIA, showing Habit and detached Flower.

**TIARELLA** (from *tiara*, a Persian diadem; alluding to the shape of the capsules). ORD. *Savifragææ*. A genus including five species of hardy, erect, slender, perennial herbs; one is a native of the Himalayas, and the rest are North American. Flowers white, on slender pedicels; calyx tube short, the limb five-lobed; petals five, entire; stamens ten, the filaments elongated;

**Ticorea**—continued.

**T. foetida** (foetid). *fl.* white, six or seven in a corymb, sessile along the branches; petals six times longer than the calyx. February. *l.* consisting of three equal, almost sessile leaflets, which, when bruised, emit a disagreeable smell. *h.* 10ft. Guiana, 1825. Shrub. (A. G. 277.)

**T. jasminiflora** (Jasmine-flowered). *fl.* white, sessile along the branches of the rather loose panicle. September. *l.* consisting of three lanceolate, acuminate, tapering leaflets. *h.* 20ft. Brazil, 1827. Tree.

**TIGAREA.** A synonym of **Purshia** (which see).

**TIGER IRIS.** See **Tigridia**.

**TIGER LILY.** See **Lilium tigrinum**.

**TIGER MOTHS.** A name commonly applied to several moths of the tribe *Bombycina* (see **Moths**), probably on account of the bright, variegated colours of its more conspicuous members. The larvæ of all the Tiger Moths are rather thick-bodied, and are closely covered with long, stiff hairs, usually brown or black, rising from numerous prominent warts along the back and sides. They feed on low plants, chiefly herbs, and seldom do much harm in gardens, as they prefer Dock, Plantains, and other weeds, rather than cultivated plants. In autumn, and again in spring, the larvæ of the Common Tiger, and of the Ruby Tiger, are to be seen on every road, crawling in search of food or of safe retreats for the winter, or for pupation. When full grown, in spring or early summer, they spin slight cocoons on the food-plants, or among dead leaves and surface rubbish, and in them become pupæ, from which the moths emerge in two or three weeks. The species of most common occurrence in gardens are the two just mentioned.

The common Tiger (*Arctia caja*) varies in size from 2in. to 3in. across the fore wings, which are brown, with irregularly branching, pale cream-coloured lines and spots. The hind wings are red, with six or seven blue-black spots, of which three lie in a band parallel to the hind margin. The head is brown, with a crimson collar; the thorax is brown; and the abdomen is crimson, with a series of oblong, black spots down the middle, and a row of black dots along each side. This species is very apt to vary in the colour of the wings; in some the dark tints prevail, in others the pale. The larva of this Moth is known generally as the "Woolly Bear," from its dense coat of long hairs. The latter, on the back, are dark near their bases, grey near the tips; along the sides and near the head they are brown. The larvæ hibernate while small, and feed up in spring, when they subsist on a great variety of plants in gardens. The moths usually emerge about July.

The Cream-spotted Tiger Moth (*Arctia villica*) is a little like *A. caja*, but smaller, as it does not exceed 2½in. in spread of fore wings. This species is black, with

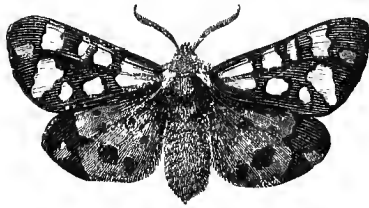


FIG. 34. CREAM-SPOTTED TIGER MOTH.

eight cream-coloured spots (see Fig. 34). The hind wings are orange-yellow, with a few small, central, black spots, and an irregular, black band along the hind margin. The larva is a good deal like the "Woolly Bear," and, like it, feeds on various herbs.

The "Wood Tiger" (*Nemophila Plantaginis*) seldom exceeds 1½in. across the fore wings. These are black, with pale spots, passing into yellow at the margins.

**Tiger Moths**—continued.

The hind wings are dull, deep yellow or orange, with velvety-black markings, in the form of black spots, along the hind margin, and at the base. The larva is hairy; the hairs near the end of the body are black, those in the middle of the body are red-brown. It feeds on low weeds, and is scarcely ever seen in gardens, as this moth frequents moors.

The Scarlet Tiger (*Callimorpha dominula*) is confined to localities where the Hound's-tongue (*Cynoglossum*) grows. It reaches about 2½in. across the fore wings, which are dark olive-brown, with a metallic-green lustre, and bear about ten spots, those in the centre yellow or orange, the others cream-coloured. The hind wings are crimson, with large, black spots near the margins.

The Ruby Tiger (*Phragmatobia fuliginosa*) differs from all the above alike in size (about 1½in. across the front wings) and in colour. The fore wings are dull red-brown, with two black dots near the middle. The hind wings are dull pink near the base, smoky-brown near the margin, and have two dark dots near the middle; the fringes are pink. The head and thorax are brown; the abdomen is pink, with one central and two lateral rows of dark spots. The larvæ are yellowish-brown, smoke-coloured, or dark, and very hairy. They are often to be seen in autumn, seeking secure retreats for the winter, and in spring they emerge from their retreats to feed up. In April or May they spin loose, oval cocoons among herbage, and become dark pupæ; from these the moths emerge in June. The larvæ feed chiefly on low weeds, but may at times live on garden produce.

All the Tiger Moths have thick, heavy bodies. They fly at all hours by day, and also by night.

Should the larvæ ever become too numerous, hand-picking is the best remedy.

**TIGLIUM.** Included under **Croton**.

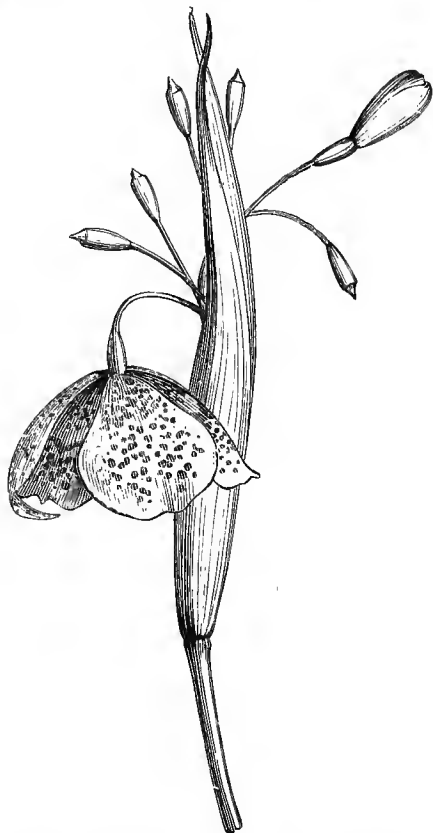
**TIGRIDIA** (from *tigris*, a tiger, and *eidos*, like; in reference to the spotted flowers). Mexican Tiger Flower; Tiger Iris. **SYNS.** *Beatonia*, *Hydrotania*. **ORD.** *Iridæ*. This genus includes about seven species of greenhouse or half-hardy, bulbous plants, from Mexico, Central America, Peru, and Chili. Flowers few in a spathe, in one species (*T. pavonia*) very large; perianth concave, with no tube; segments free, the outer ones very broad, unguiculate, the inner ones much smaller and erectopate, often obtuse, more or less undulated; filaments connate in a cylindrical tube; spathe one, terminal, or two at the axils of the floral leaves, long and unequally pedunculate. Leaves at base of stem few, narrow, or broader and plicate-veined; cauline or floral ones often two or three, scattered. *T. pavonia* and its varieties are very handsome subjects when in flower. All the species thrive best in a light, sandy soil; if planted outside, a warm, sunny position, with south aspect, should be accorded them. The roots must be lifted in the autumn, when the leaves have died down, stored away in some place where frost cannot reach them, and replanted in the following April. Propagation may be effected either by seeds or by offsets.

**T. atrata** (dark).\* *fl.*, perianth dark purple; outer segments with pale green-spotted claws and a dark brown lamina; spathe two-valved, 2½in. long. April. *l.* plicate, 1ft. to 1½ft. long. Stem 2ft. high. South Mexico, 1843. Greenhouse.

**T. conchiflora** (shell-flowered). A synonym of *T. pavonia conchiflora*.

**T. curvata** (curved). *fl.*, perianth yellowish, spotted with purple; peduncles curved; spathe one-valved. April. *l.* plicate, 3in. long. Stem slender, 1ft. high. Real Del Monte, 1843. Greenhouse.

**T. lutea** (yellow). *fl.* pedicellate, fragrant; perianth yellow, obscurely dotted, the outer segments obovate, 1in. long, obscurely crenate on the margins, the inner ones exappendiculate; spathe terminal, five or six-flowered, bivalved. June. *l.* ensiform, amplexicaul, very long-acuminate. Stem terete, glabrous, arching, 8in. to 10in. long. Peru, 1843. Half-hardy. (B. M. 6295.)

**Tigridia**—continued.FIG. 35. INFLORESCENCE OF *TIGRIDIA MELEAGRIS*.

**T. Meleagris** (Meleagris).\* *f.* in colour and form resembling *Fritillaria pyrenaica*, four or five in a leafy, convolute spathe 2½ in. long; segments marked with a few broken bands of crimson, slightly unguiculate. Spring. *l.* solitary, straight-veined, plaited. Stem about 1½ ft. high. Mexico. Greenhouse. See Fig. 35. SYN. *Hydrotentia Meleagris* (B. R. xxviii. 39).

**T. pavonia** (peacock-spotted).\* Flower of Tigris; Peacock Tiger Flower. *f.* on elongated pedicels; perianth golden-orange, the outer segments broadly ovate, 3 in. long, mucronate at apex, the inner ones 1½ in. long, concave-channelled below the middle; spathe three-flowered, 4 in. long. June. *l.* lanceolate-ensiform, plicate, acute; radical ones distichous, 10 in. to 18 in. long, sheathing at base. Stem cylindrical, dichotomous, leafy, 1 ft. to 2 ft. high. Mexico, 1796. Half-hardy. SYNS. *Ferraria Pavonia* (A. B. R. 178; L. B. C. 1424), *F. Tigridia* (B. M. 532).

**T. p. albiflora** (white-flowered).\* In this variety, the ground-colour of the perianth is a beautiful white.

**T. p. conchiflora** (shell-flowered). A rather dark yellow-flowered form. SYN. *T. conchiflora* (F. d. S. 908, fig. 2; S. B. F. G. 128).

**T. p. speciosa** (showy). In this form, the ground-colour is deeper and brighter than in the type. (F. d. S. 908, fig. 1.)

**T. Van Houttei** (Van Houtte's).\* *f.* issuing from spathes which terminate the branches of the stem; perianth about 1½ in. across, the outer and larger segments yellow, with a broad basal blotch and marginal veins of purple, the inner segments lilac, veined with purple. Spring. *l.* few, ensiform, plaited; upper ones shorter. *h.* about 1 ft. South Mexico, 1875. Greenhouse. (F. d. S. 2174.)

**T. violacea** (violet). *f.*, perianth violet, campanulate, nodding, the blade of outer segments rose-purple, the claw white, dotted with rose-purple, 3 in. long; inner segments deflexed, white, dotted in the middle; spathe three or four-flowered, two-valved. May. *l.* ensiform, plicate-nerved; radical ones 8 in. to 14 in. long. Stem terete, erect, 7 in. to 14 in. high, dichotomous at apex. South Mexico, 1838. Greenhouse. SYN. *Bentonia purpurea*.

**TIGRIS, FLOWER OF.** An old name for *Tigridia Pavonia*.

**TILE-ROOT.** See *Geissorhiza*.

**TILESIA.** A synonym of *Wulffia* (which see).

**TILIA** (the old Latin name for the Lime, used by Virgil and Pliny). Lime-tree; Linden. ORD. *Tiliaceæ*. This genus includes about eight species of ornamental, lofty-growing, hardy, stellate- or simply-pubescent trees, inhabiting the temperate regions of the Northern hemisphere. Flowers white or yellowish; sepals five; petals five, naked or furnished with petaloid scales on the inside; stamens numerous, free or irregularly disposed in bundles; bract of the peduncle leaf-like, adnate for half its length; cymes axillary or terminal. Fruit globose, nut-like, indehiscent, one or two-seeded. Leaves often obliquely cordate, serrated. Several species are grown in this country, one being a native. The flowers contain a quantity of honey, and are consequently haunted by bees. Russian Bass or Bast Mats, so well known to gardeners, are prepared from the inner bark of various species. The smooth, light, delicately-white, and uniform wood of *T. platyphyllos* and *T. vulgaris* is in great demand by carvers, turners, and musical instrument makers.

*Culture, &c.* A good, loamy soil is suited to the requirements of Limes. In dry situations, the species never attain a large size, and they lose their leaves earlier than any other tree. Being a tree of the plains, rather than of the mountains, the Lime does not appear suitable for very exposed situations. Propagation is usually effected by layers, which are made in the nurseries, in autumn and winter, and become rooted, so as to admit of being taken off, in a year. Seeds are seldom ripened in this country; when obtainable, they should be sown immediately after being gathered, but the raising of plants by this means is an exceedingly slow process. Du Hamel states that "the French gardeners, when they want a supply of young Lime-trees, cut over an old one close by the surface of the ground, which soon sends up a great number of shoots: among these they throw in a quantity of soil, which they allow to remain one, two, or three years; after which they find the shoots well rooted, and of a sufficient height and strength to be planted at once where they are finally to remain." This mode is still practised in France and Belgium, both with the Lime and the Elm. The Lime-tree bears transplanting when of a considerable size; but when grown for this purpose, it should be taken up and re-planted every two or three years. Trees that have stood some years without being removed should have the roots cut round, at from 3 ft. to 4 ft. from the stem, a year before transplanting, in order to stunt the growth, both of the head and roots, and to induce the production of smaller roots and fibres. The different cut-leaved and variegated forms are usually increased by grafting on strong plants of any of the common species.

*Insects, &c.* Of foes to the Lime-tree, only a few do so much injury as to call for detailed notice here. The bark and wood are liable to attacks by Beetles, though healthy trees seldom suffer thereby. The caterpillars of several kinds of Moths, most of them small, frequently disfigure the leaves by drawing them together by webs, or rolling them to form tubes, and by eating large holes in them. The more destructive species belong to the Winter Moths, the females of which either have no visible wings, or have them so small as to be useless (see *Hybernica* and *Winter Moth*). Their ravages may be lessened by shaking the branches, and collecting the caterpillars when they drop from their tubes; or, yet more effectually, by interposing an obstacle, e.g., a belt of tar, in autumn and winter, round the foot of the tree, to prevent the ascent of the female moth to lay her eggs.

Lime-trees are very liable to be injured by the growth of galls on the younger parts. A Gall-midge (*Cecidomyia floricola*) often makes galls on the branches or leaf-stalks, in the form of swellings about the size and form of a small pea, in the centre of which the larvæ may

**Tilia**—continued.

be found. The leaves are very liable to be galled by Mites of the genus *Phytoptus*. These Mites are extremely small, requiring a considerable magnifying power to show them; but the genus is easily recognised by having only four legs, instead of eight, as in other Mites, and by being gall-makers—a mode of life not shared by other Mites. The Mites do not in themselves afford characters by which the species can be clearly distinguished from one another; but the galls made by them are very constant in form and aspect, so that they can be readily recognised. On Lime leaves there may be found three at least, very distinct from one another. The first resembles small nails, and has received the popular name of Nail-galls. It has also received the name of *Ceratoneon extensum*. Frequently, many of these galls stand on almost every leaf of the tree. Another gall is in the form of small, round, hard warts, at the origin of the larger leaf-veins; while the third forms velvety patches,  $\frac{1}{4}$  in. to  $\frac{3}{4}$  in. across, on the lower surface of the leaves, so much resembling a Fungus that it was at one time described as such under the name *Erineum tiliaceum*. It consists of a patch of hairs, between which the Mites live. The hairs are at first white, but show a tendency to become brown.

Except where very numerous, these galls can hardly be regarded as doing much harm to the trees. The most likely method of limiting their attacks is to remove the affected leaves or branches, and to destroy them, as soon as possible after the first appearance of any of the galls on a plant.

**T. alba** (white). A synonym of *T. argentea*.

**T. a. pendula** (white weeping). A synonym of *T. petiolaris*.

**T. americana** (American). American Basswood or Whitewood. *fl.* yellowish-white; petals truncate and crenate at apex, equalling the style, furnished with scales. July and August. *fr.* yellow, the size of a large pea. *l.* deeply cordate, abruptly acuminate, sharply serrated, somewhat coriaceous, glabrous, turning yellowish-brown in decay. *h.* 60ft. to 70ft. North America, 1752.

**T. a. pendula** (weeping). A garden synonym of *T. petiolaris*.

**T. a. pubescens** (downy). *fl.* pale yellow. June. *l.*  $\frac{3}{4}$  in. to  $\frac{4}{5}$  in. in diameter, the under surface, when young, rather paler than the upper, but at length nearly the same colour; serratures broad and short. *h.* 50ft. to 70ft. 1726.

**T. argentea** (silvery).\* White or Silver Lime. *fl.* yellowish-white, very fragrant; petals each with a scale on the inside. June to August. *fr.* yellow, evidently ribbed. *l.* cordate, somewhat acuminate, rather unequal at base, serrated, smooth above, white-downy beneath, four times the length of the petioles. *h.* 30ft. to 50ft. Eastern Europe, 1767. (W. D. B. 71, under name of *T. alba*.)

**T. a. pendula** (weeping). A synonym of *T. petiolaris*.

**T. cordata** (heart-shaped). *fl.* yellowish-white; petals without a scale at their base. Summer. *fr.* crustaceous-pubescent, globose or ellipsoid, faintly-ribbed. *l.* glabrous, glaucous, and pubescent, in the axils of the nerves beneath. Europe and Siberia. A small tree, generally with leaves smaller in size than those of either *T. platyphyllos* or *T. vulgaris*. This is the last of the three to flower. It is found here and there in woods in Britain, and is regarded by some authorities as a truly indigenous species. SYNS. *T. microphylla*, *T. parvifolia* (Sy. En. B. 287), *T. ulmifolia*.

**T. dasystyla** (thick-styled).\* *fl.*, lower part of the pyramidal style tomentose and persistent as a point. Summer. *l.* large, obliquely truncate at base or sometimes sub-cordate, slightly hairy beneath and bearded in the axils of the nerves. Buds glabrous. *h.* 30ft. to 60ft. South Tauria, 1884.

**T. europæa**. See *T. platyphyllos* and *T. vulgaris*.

**T. e. laciniata** (torn). A synonym of *T. platyphyllos asplenifolia*.

**T. grandifolia** (large-leaved). A synonym of *T. platyphyllos*.

**T. heterophylla** (variable leaved). American White Basswood. *fl.* greenish-yellow, few in a loose cyme; petals obtuse, crenellated. July and August. *l.*  $\frac{1}{4}$  in. to  $\frac{8}{10}$  in. in diameter, very oblique, more or less cordate, abruptly acuminate, green and somewhat shining above, very white and velvety-tomentose and conspicuously veined beneath. *h.* 30ft. to 50ft. North America, 1811.

**T. intermedia** (intermediate). A synonym of *T. vulgaris*.

**T. microphylla** (small-leaved). A synonym of *T. cordata*.

**T. parvifolia** (small-leaved). A synonym of *T. cordata*.

**T. petiolaris** (petiole).\* *fl.* yellow-green, with five petaloid scales inserted amongst the stamens. July. *fr.* depressed,

**Tilia**—continued.

globose, five-lobed, warted,  $\frac{1}{4}$  in. in diameter. *l.* pale green above, white, hoary-pubescent beneath; petiole as long as, or longer than, the blade. Branchlets pendulous, leafy. Trunk erect. *h.* 50ft. Crimea (?). This greatly resembles the White Lime, but is easily recognised by its much longer leafstalks and its warted fruits. (B. M. 6737.) SYNS. *T. alba pendula*, *T. americana pendula* (of gardens), *T. argentea pendula*.

**T. platyphyllos** (broad-leaved).\* *fl.* yellowish-white; petals without a scale at their base. June. *fr.* obovate, globose, with from three to five prominent ribs when ripe. *l.* downy sometimes on both surfaces, always on the entire under surface. *h.* 70ft. to 90ft. Europe (Britain). This species is the earliest to flower. SYNS. *T. europæa* (in part), *T. grandifolia* (Sy. En. B. 285).

**T. p. asplenifolia** (Spleenwort-leaved). This has curiously lacinated leaves and is not so vigorous or tall a grower as the type. SYN. *T. europæa laciniata*.

**T. p. aurantia** (orange). In this form, the bark of the young twigs is of an orange-yellow colour.

**T. p. Blechiana** (Blech's). *l.* very large. A distinct and vigorous form of garden origin.

**T. p. pyramidalis** (pyramidal). A form of distinctly pyramidal habit.

**T. p. vitifolia** (Vine-leaved).\* A pretty variety, with lobed, Vine-like leaves. SYN. *T. vitifolia*.

**T. ulmifolia** (Elm-leaved). A synonym of *T. cordata*.

**T. vitifolia** (Vine-leaved). A synonym of *T. pyramidalis vitifolia*.

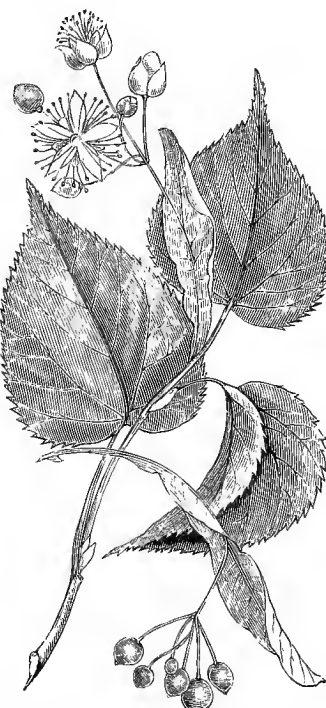


FIG. 36. BRANCHLET, AND DETACHED CLUSTER OF FRUITS, OF *TILIA VULGARIS*.

**T. vulgaris** (common).\* Lime, Lin, Linden, or Line-tree. *fl.* yellowish-white; petals without a scale at their base. Summer. *fr.* woody, pubescent, not ribbed when ripe. *l.* glabrous above, pubescent in the axils of the veins beneath. Europe, Caucasus (naturalised in Britain). This species begins to flower when *T. platyphyllos* is nearly past. See Fig. 36. SYNS. *T. europæa* (in part), *T. intermedia* (Sy. En. B. 286).

**T. v. variegata** (variegated). This only differs from the type in having the leaves blotched with dull creamy-white. SYN. *T. europæa variegata*.

**TILIACEÆ**. A natural order of trees, shrubs, or rarely herbs, broadly dispersed, numerous in the tropics. Flowers regular, hermaphrodite or rarely unisexual,

**Tiliaceæ**—continued.

axillary or terminal, often cymulose; sepals five, rarely three or four, free or connate, often valvate; petals as many or fewer, or none, alternating with the sepals, inserted around the base of the torus, entire or incised; aestivation contorted or variously imbricated, induplicate, or valvate; stamens usually indefinite; filaments free, or connate in a ring of five to ten bundles; anthers two-celled; ovary free, sessile. Fruit two to ten-celled, or, by abortion, one-celled, variable. Leaves alternate, in a few species opposite or nearly so, simple, penninerved or palmnerved, entire, toothed, or rarely lobed; stipules twin, usually small and deciduous, rarely larger and persistent or absent. Several of the species in this order furnish materials for making cord. Jute, the fibre of *Corchorus capsularis*, has, of late, become the rival of hemp in the English market, many thousands of tons being annually imported from India. The order comprises about 46 genera and 330 species. Examples: *Aristotelia*, *Corchorus*, *Prockia*, *Tilia*, *Triumfetta*.

**TILIACORA** (the Bengalese name). SYN. *Braumea* (in part). ORD. *Menispermaceæ*. A monotypic genus. The species is a stove, evergreen, climbing shrub, thriving in a compost of sandy loam and peat. Cuttings will root readily in sand, under a glass, in heat.

**T. racemosa** (racemose-flowered). *fl.* yellow; panicles axillary, 6in. to 12in. long, hoary, at length glabrous; branches 1in. long, the males three to seven-flowered, the females simple and one-flowered. May. *fr.*, drupe ½in. long, obovoid, stalked, subcompressed, red. *l.* 3in. to 6in. long, ovate, acuminate, glabrous, acute, truncate, rounded, or sub-cordate at base, thin, the margins undulated; petioles ¼in. to 1in. long. East Indies, 1820.

**TILL.** Another name for Lentil.

**TILLEA** (named in honour of M. A. Tilli, 1653-1740, an Italian botanist). Including *Bulliarda*. ORD. *Crasulaceæ*. A genus comprising about twenty species of aquatic or terrestrial, cosmopolitan herbs. Flowers white or reddish, minute, variously disposed. Leaves opposite, cylindrical, subulate, or flat, entire. *T. muscosa* (Mosey Redshanks) is a British plant. Several exotic species have been introduced, but their interest is of a botanical character only.

**TILLANDSIA** (named in honour of Eliae Tillande, a Swedish botanist, and Professor of Medicine in the University of Abo). SYN. *Renealmia* (of Linnæus). Including *Allardtia*, *Anoplophytum*, *Bonaparteia*, *Phytarrhiza*, *Platystachya*, *Vriesia*, and *Wallisia*. ORD. *Bromeliaceæ*. A large genus (according to the authors of the "Genera Plantarum," nearly 120 species) of very handsome, stove, epiphytal or rock-loving, very rarely terrestrial, glabrous or often more or less furfuraceous herbs, natives of tropical America, a few extending into North America. Flowers solitary in the bracts; sepals erect, rather rigid, free, closely imbricated; petals free, deciduous, the erect claws connivent in a tube, the blades spreading; stamens free; filaments filiform; anthers oblong-linear, erect, shorter than the petals, or sometimes exserted; bracts variable; spike terminal, simple or compound, rarely reduced to a one-flowered peduncle. Capsules oblong or linear, septicidally three-valved. Leaves narrow, entire. Most of the plants of this genus are epiphytal on trees under natural conditions; but under cultivation it is found best to treat the majority of them as pot-plants, the exceptions being such as *T. bulbosa*, *T. Gardneri*, *T. irioides*, and *T. usneoides* (Old Man's Beard)—which last could not well be grown in a pot, and, as it makes no roots, does not require soil. These should be fastened on to blocks of cork or soft wood, and a little sphagnum placed about them to root in. Grown in pots, the strongest kinds, e.g., *T. corallina*, *T. Itatiaie*, the gigantic *T. regina*, and *T. splendens*, require a strong soil, such as fibrous loam with rotted manure added, or loam, peat, and manure. *T. Lindenii* and the whole of the *Vriesia*

**Tillandsia**—continued.

section thrive best in a mixture of loam, peat, and leaf mould, with a sprinkling of crushed bones added. The small, grassy-leaved kinds, of which *T. angustifolia* and *T. virginialis* are examples, may be grown in peat and sphagnum. All the species delight in abundant sunlight, a high temperature during summer, plenty of water (though the soil must not be kept saturated), and syringing overhead twice a day. In winter, they should be kept from getting quite dry, but need not be syringed. Nothing can exceed the beauty of many of the Tillandsias, when in good health, and bearing their richly-coloured flowers. There is no more beautiful plant than *T. Lindenii*, whilst *T. carinata*, *T. Morreni*, *T. psittacina*, and *T. splendens*, are most richly coloured. Propagation is effected by seeds and suckers, chiefly by the latter. They should be allowed to grow large before being detached from the parent, and inserted singly in pots just large enough to hold the sucker, using a compost of loam, peat, and leaf mould. The suckers must not be confined in a close frame for propagating, but kept moderately moist and well shaded. Spring is the best season for detaching them.

With the assistance of the following "Classified List of the Cultivated Tillandsias" (for which we are indebted to Mr. J. G. Baker, who has generously lent the manuscript of his unpublished Monograph for the purpose), the names of any of the species described below may be the more readily determined.

Leaves spaced out on a long stem	<i>Strepsia.</i>
Leaves crowded, rosulate, coriaceous, acuminate, densely lepidote.	
Inflorescence distichous	<i>Diaphoranthema.</i> <i>Phytarrhiza.</i> <i>Platystachys.</i> <i>Anoplophytum.</i> <i>Pityrophyllum.</i>
Inflorescence multifarious	
Leaves rosulate, broader and thinner, obscurely lepidote.	<i>Allardtia.</i> <i>Wallisia.</i> <i>Vriesia.</i> <i>Cyathophora.</i> <i>Conostachys.</i>
Inflorescence distichous	
Inflorescence multifarious	
SUB-GENUS I. STREPSIA.	
Flowers solitary in the axils of the stem leaves.	Stems pendulous, filiform.
	usneoides.
SUB-GENUS II. DIAPHORANTHEMA.	
Flowers one or few; style and stamens short.	Leaves subterete. Leafy stem short.
	bryoides.
	recurvata.
SUB-GENUS III. PHYTARRHIZA.	
Flowers spicate or paniced; petal blade broad, spreading; style and stamens short.	Leaves rosulate.
	crocata.
	Duratii
	ixioides
	xiphioides
SUB-GENUS IV. PLATYSTACHYS.	
Flowers spicate or paniced; petal blade lingulate; stamens and style longer than the calyx.	Leaves rosulate.
	anceps
	angustifolia
	Balbisiana
	bulbosa
	Caput-Medusæ
	distachya
	filifolia
	flexuosa
	glaucophylla
	Karwinskiana
	monadelphæ
	narthecioides
	polystachya
	pruinosa
	setacea
	streptophylla
	tectorum
	vernicosa
	vestita
	xiphostachys

**Tillandsia**—continued.

## SUB-GENUS V. ANOPILOPHYTUM.

Flowers spicate or panicle. Leaves rosulate, narrow, acuminate.

dianthoidea  
didisticha  
Gardneri  
gemmiflora  
pulchra  
stricta

## SUB-GENUS VI. PITYROPHYLLUM.

Flowers in a capitulum in the centre of the rosette of leaves.

brachycaulos  
ionantha

## SUB-GENUS VII. ALLARDTIA.

Differs from *Platystachys* only in leaf.

cyanea  
Rozei  
virginalis

## SUB-GENUS VIII. WALLISIA.

Differs from *Phytarrhiza* only in leaf.

Hamaleana  
Lindenii  
umbellata

## SUB-GENUS IX. VRIESIA.

Petals white or yellow, large, with two scales on the claw. Leaves broad, usually lorate.

Spikes dense, simple.

Barilleti  
Billbergiae  
carinata  
chrysostachys  
Duvalliana  
gladioliflora  
heliconioides  
incurvata  
splendens  
viminalis  
viridiflora

Spikes lax, simple.

amethystina  
corallina  
ensiformis  
fenestralis  
guttata  
Jongheii  
paraibica  
Platzmanni  
psittacina  
psittacino-carinata  
psittacino-scalaris  
scalaris  
Warmingii  
Wawrae

Spikes disposed in a panicle.

gracilis  
hieroglyphica  
Morreni  
Philippo-Coburgi  
regina  
reticulata  
Rodigasiana  
tessellata

## SUB-GENUS X. CYATHOPHORA.

Differs from *Allardtia* in the inflorescence.

utriculata

## SUB-GENUS XI. CONOSTACHYS.

Differs from *Vriesia* in the inflorescence.

Malzinei  
Saundersii

**T. acaulis** (stemless). A synonym of *Cryptanthus acaulis*.

**T. aloifolia** (Aloe-leaved). A synonym of *T. flexuosa*.

**T. amethystina** (amethystine). *fl.* yellow, 2½ in. long, distichous, distant, sub-sessile, tubular; petals twice the length of the sepals; anthers exserted; bracts greenish-yellow, small; spike distichous, the rachis pulvinate; scape slender, erect, exceeding the leaves, bracteate. *l.* 12 in. to 16 in. long, lingulate, acuminate, shining-green above, amethystine beneath. South Brazil, 1884. *SYN. Vriesia amethystina* (B. H. 1884, 15-16).

**T. anceps** (two-edged). *fl.* 2 in. long; sepals pale yellow, keeled, imbricated; petals white and purplish, twice as long as the sepals; bracts greenish-yellow, red-margined, cymbiform, bluntly mucronate; spike oblong, solitary; scape nearly 1 ft. long. June.

**Tillandsia**—continued.

*l.* numerous, imbricated, about 1 ft. long, curved to one side, broad, sheathing, and very concave at base, becoming subulate above, dingy-green, whitish-scaly outside. West Indies and Central Mexico, 1824. *SYNS. T. setacea*, of Hooker (B. M. 3275), *T. tricolor* (B. H. 1879, 10-11), *Phytarrhiza anceps* (B. H. 1879, 20-1).

**T. angustifolia** (narrow-leaved). *fl.* blue; sepals half as long as the erect petals; bracts imbricate-distichous; central spike 4 in., lateral ones 1½ in. to 2 in., long. August. *l.* linear from a subulate base, convolute, curved, about as long as, or longer than, the stem, lepidote. *h.* 1 ft. to 2 ft. West Indies, 1822.

**T. argentea** (silvery). A garden synonym of *T. Gardneri*.

**T. argentea** (silvery), of K. Koch. A synonym of *T. tectorum*.

**T. Balbistiana** (Balbis'). *fl.*, sepals exceeding half the petals, all distinct; petals violet, erect, convolute, spatulate-linear, 1½ in. long; stigmas exserted; bracts green, red, and yellow, imbricate-distichous, oblong-lanceolate, acuminate, ten lines long; spike compound, compressed; lateral spikes three to eight, 2 in. to 3 in. long, appressed, alternate. *l.* lanceolate-linear from a subulate base, convolute, recurved, exceeded by the stem, lepidote. *h.* 1 ft. to 1½ ft. West Indies, 1874. (B. H. 1879, 6-7.)

**T. Barilleti** (Barillet-Dechamps). *fl.* yellow; bracts yellowish-olive, very numerous spotted with dark blood-colour, distichous, clustered, conduplicate, navicular, equitant; spike simple, elongated, ancipitous; scape about as long as the leaves. *l.* green, smooth-edged, 16 in. to 20 in. long, shortly acuminate, with the margins rolled in at the middle. Andes of Ecuador, 1883. *SYN. Vriesia Barilleti* (B. H. 1883, 3).

**T. Billbergiae** (Billbergia-like). *fl.* tricoloured (green, white, and red), sessile; corolla dilated. *l.* resembling those of *Billbergia*, quite glabrous, rosulate, imbricate, dilated, amplexicaul at the base, very thin, slightly recurve, oblong-ligulate, oblique, and very shortly and abruptly apiculate, sub-coriaceous, pale green, furfuraceous at the base outside. *h.* 10 in. Mexico.

**T. brachycaulos** (short-stemmed). *fl.* purple, about twelve in a head, which is sessile amongst the leaves. *l.* linear, channelled, recurved, 6 in. to 8 in. long, red on the upper surface, greyish-green beneath, slightly scurfy. Central Mexico, 1878. A handsome, dwarf species. (B. H. 1878, 11.)

**T. brachystachys** (short-spiked). A synonym of *T. carinata*.

**T. bryoides** (Moss-like). *fl.* three or four in a small, distichous spike; style and stamens short; scape capillary, 2 in. long. *l.* small, lanceolate-subulate. Stems slender, branched. South Brazil, &c., 1880. A small, Moss-like plant. *SYN. S. polytrichoides*.

**T. bulbosa** (bulbous). *fl.*, sepals distinct; petals violet, white at the point, 1½ in. long, recurved at the summit, convolute spatulate-linear; bracts eight to nine lines long, imbricate-distichous; spikes five to eight, sub-equal, approximate, spreading, 2 in. to 3 in. long. November. *l.* convolute-filiform, greenish, minutely lepidote; rosulate ones dilated into the roundish sheaths of the bulbous stem-base, flexuous; uppermost ones exceeding the spikes. *h.* 8 in. to 12 in. West Indies, Buenos Ayres, &c., 1823. (H. E. F. 173.) *SYN. T. paucifolia*. *T. eminens*, *T. erythroa*, *T. inanis*, and *T. pumila*, are mere varieties of this species.

**T. Caput-Medusae** (Medusa's Head). *fl.* six or seven to a spike; bracts green; spikes about four, forming a compound panicle; scape shorter than the leaves, clothed with elongated bracts. *l.* tumid at base, forming a kind of bulb, lanceolate, thick, channelled, divaricate, arched, undulated, unequal, shining, silky-grey. Mexico, 1880.

**T. carinata** (keeled).\* *fl.* projecting ½ in. beyond the bracts; sepals pale yellow, keeled; petals pale yellow, twice as long as the sepals, cohering nearly to the dark green tips; bracts green beyond the middle, scarlet below, 2 in. long, closely imbricated, laterally much compressed; spike 5 in. long, broadly ovate, the rachis scarlet; scape scarlet, 6 in. long, stout, cylindric, the sheaths green-tipped. November. *l.* 4 in. to 6 in. long, lin. to 1½ in. broad, spreading and recurved, pale green, broadly strap-shaped from a dilated, sheathing base. South Brazil, 1866. A very brilliant plant. *SYNS. T. brachystachys*, *Vriesia brachystachys* (B. M. 6014; R. G. 1866, 518), *V. psittacina brachystachys* (B. H. 1870, 8), *V. p. carinata* (B. H. 1882, 10-12).

**T. chrysostachys** (golden-spiked). *fl.* yellow, regular; sepals free, lanceolate; petals longer, ligulate, obtuse; bracts yellow, conduplicate; spike simple, distichous, elliptic, elongated; scape elongated, erect, bracteate. *l.* numerous, rosulate, lax, arched, coriaceous, short and broad, loriform, ligulate at base, of a plean-green, but rosy and glaucous beneath towards the base. Stem short. Andes of Peru, 1881. (B. M. 6906.)

**T. circinalis** (crozier-like). A synonym of *T. Duratii*.

**T. circinata** (crozier-like). A synonym of *T. streptophylla*.

**T. complanata** (complanate). A synonym of *T. xiphostachys*.

**T. corallina** (coral-red).\* *fl.* green, distant, refracted, each subtended by a long, purplish-crimson bract, the scape and rachis being of the same brilliant colour; petals large, with two scales on the claw; spikes distichous. *l.* oblong-ligulate, blunt and apiculate, green. Minas Geraes, 1871. *SYNS. Echinolirion corallinum* (F. M. n. s. 116), *Vriesia corallina* (R. G. 1870, 671).



**Tillandsia**—continued.

**T. c. rosea** (rosy). This differs from the type in its rose-tinted flowers. SYN. *Encholirion roscum*.

**T. cordobensis** (Cordoba). A synonym of *T. recurvata*.

**T. crocata** (saffron-yellow). *fl.* of a saffron-yellow colour, about five in a short, elliptic, distichous spike; scape elongated, slender, villous, nearly naked. *l.* distichous, long, linear-subulate, recurved, covered with silky, white hairs. Stem undulated, branched. South Brazil, 1880. SYN. *Phytarrhiza crocata*.

**T. cyanea** (blue). *fl.* blue, in a branching panicle from the centre of a rosette of strap-shaped, entire leaves. *h.* 2½ ft., when in flower. Guatemala, 1852. SYNS. *Allardtia cyanea*, *Platy-stachys cyanea*.

**T. diantholdea** (Dianthus-like). *fl.*, corolla tubular, the tube cylindrical, the limb blue, spreading or reflexed; bracts purplish-rose, ovate-lanceolate, acute, persistent; spike loose, six to ten-flowered. *l.* amplexicaul, the outer ones recurved, the inner ones erect or inflexed, coriaceous, rigid, triquetrous towards the apex, acute, entire, silky-glaucous. Stem nearly terete, simple, ascending, 3 in. to 5 in. long. Uruguay, &c., 1810. (R. G. 85.) SYN. *T. stricta*, of Lindley (B. R. 1338).

**T. d. rosea** (rosy). *fl.* white, issuing from rosy-pink bracts; scape short. *l.* glaucous, lanceolate-subulate, recurved, channelled. 1861. SYNS. *T. recurvifolia* (B. M. 5246), *T. rosea* (B. R. 1357).

**T. didisticha** (twice-two-rowed). *fl.* white; spikes elliptic, forming a crowded, distichous panicle; scape elongated, arched, clothed with bracts. *l.* thick and robust, disposed in a rosette, lanceolate, channelled, acuminate, cinereous. South Brazil, 1881. SYN. *Anoplophytum didistichum*.

**T. distachya** (two-spiked). *fl.*, sepals ½ in. long, free to the base; corolla white, more than twice as long as the calyx, the petals oblanceolate, with a long claw; bracts green, oblong-lanceolate, about 1 in. long; spikes two, distichous, six to twelve-flowered; scape erect, 6 in. long, hidden by its linear, falcate leaves. *l.* twelve to fifteen in a sessile rosette, lanceolate, acuminate, about 1½ ft. long, the dilated base 1 in., the middle of the lamina ½ in., broad, the face pale green, concave, glabrous upwards, thinly lepidote towards the base, the convex back thinly lepidote throughout. *h.* 1 ft. British Honduras, 1879.

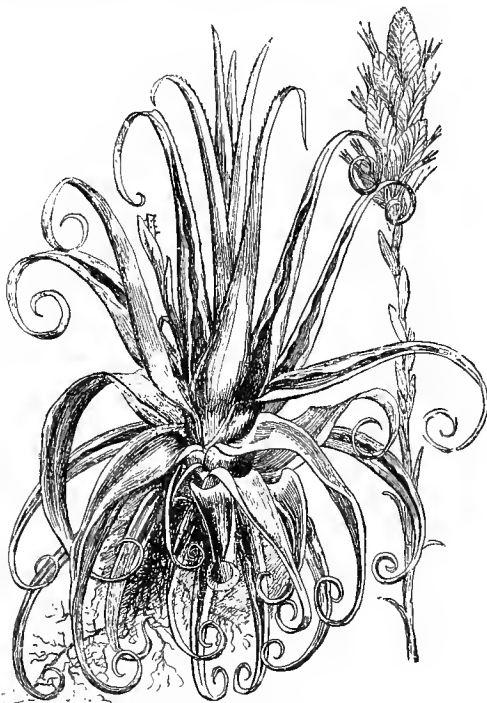


FIG. 37. *TILLANDSIA DURATII*, showing Habit and detached Inflorescence.

**T. Duratii** (Durati's). *fl.* violet; panicle compact, 3 in. to 4 in. long, composed of several dense, few-flowered spikes; scape 6 in. high. *l.* twelve to twenty, spreading, 6 in. to 9 in. long, gradually tapering to a thick, subulate, channelled, more or less cinate tip, everywhere densely silvery-lepidote. Uruguay, 1879. See Fig. 37. SYNS. *T. circinalis*, *T. revoluta*, *Wallisia Duratii*.

**Tillandsia**—continued.

**T. Duvaliana** (Duval's). *fl.* yellow, green at apex; bracts scarlet below, green above, conduplicate, keeled, beaked, equitant; spike simple, elongated-elliptic, about eighteen-flowered; scape erect, about 1 ft. high. *l.* membranous, short, lanceolate, green above, tinged with red beneath, the sheath broad. South Brazil, 1884. SYN. *Vriesia Duvaliana* (B. H. 1884, 7-8).

**T. eminens** (eminent). A form of *T. bulbosa*.

**T. ensiformis** (sword-shaped). *fl.* of a reddish-yellow colour. June. *l.* tongue-shaped, yellow-green, about 1 ft. long, the edges entire. *h.* 1½ ft. Brazil.

**T. erubescens** (blushing). A garden synonym of *T. ionantha*.

**T. erythraea** (red). A form of *T. bulbosa*.

**T. fenestralis** (fenestrate). *fl.*, sepals 1 in. long, elliptic, convolute in a tube; petals pale yellow, longer, very broad; spike distichous, elongated; scape erect, long, robust. *l.* coriaceous, about 12 in. long, broad, arched, concave, pale, beautifully marked with pellucid reticulations in the upper half, rounded-mucronate at apex, slightly spotted with red at base. Parana, 1875. Plant introduced. (B. M. 6898.) SYN. *Vriesia fenestralis* (B. H. 1884, 4-5; I. H. n. s. 215).

**T. filifolia** (thread-leaved). *fl.* pale blue, small, distichous, with reflexed petals; inflorescence paniculate, not unlike that of some of the species of *Statice*, with lax, drooping branches. *l.* subulate, filiform, spreading. Mexico, Vera Cruz, &c., 1871. A very elegant, dwarf, densely-tufted plant. SYN. *T. staticiflora* (B. H. 1871, 12).

**T. flexuosa** (flexuous). *fl.* rosy, distant; sepals 1 in. long; petals 2 in. long, linear, spreading at the summit; bracts rosy, distichous, spreading, oblong-lanceolate, bluish; spike with a few long, spreading branches, or simple. *l.* linear, acuminate, subulate at base, recurved, shorter than the stem, lepidote with minute scales or greenish, transversely zonate beneath. *h.* 1½ ft. to 3 ft. West Indies, &c., 1780. (B. R. 749.) SYNS. *T. aloifolia* (H. E. F. 205), *T. tenuifolia* (of Jacquin).

**T. Gardneri** (Gardner's). *fl.*, sepals glabrous; petals pale purplish, small; spikes four to eight, short, distichous, crowded; bracts lepidote; scape 2 in. to 4 in. high, densely sheathed with linear-subulate, lepidote leaves. *l.* 6 in. to 8 in. long, flat in the lower part, narrowed from a ½ in.-broad base to a reflexing, subulate, convolute point, everywhere densely covered with silvery scales. South Brazil, &c., 1879. SYNS. *T. argentea* (of gardens), *Anoplophytum incanum* (B. H. 1881, 11).

**T. geminiflora** (twin-flowered). *fl.* madder-coloured; sepals shorter than the petals, the limb of which is reflexed; filaments sigmoid towards the apex; bracts red, lanceolate, mucronate, rather longer than the sepals; spike oblong, sub-compound; scape erect, clothed with red, green-tipped, acuminate sheaths. February. *l.* ovate-lanceolate, channelled, acuminate, the outer ones spreading-recurved. South Brazil, &c., 1840. SYNS. *T. rubida* (B. R. 1842, 63), *Anoplophytum geminiflorum* (B. H. 1880, 11).

**T. gigantea** (gigantic). A form of *T. regina*.

**T. gladioliflora** (Gladiolus-flowered). *fl.* greenish-violet; spike simple; bracts green, closely imbricated. *l.* broadly ligulate, abruptly acuminate, glabrous. Costa Rica, 1863.

**T. glaucophylla** (glaucous-leaved).\* *fl.*, sepals greenish-white; petals purple, almost white at apex, convolute, erect; filaments banded with purple; lower bracts red, the rest green tinged with yellow and red; spikes four or five, 9 in. long; scape red, 1 ft. or more long. August. *l.* imbricated round a rather tumid base, spreading, recurved, 1 ft. to 1½ ft. long, gradually tapering from a broad and rather concave base to a slender point, sub-farinoso or flocculose. Santa Marta, 1847. SYN. *Vriesia glaucophylla* (B. M. 4415; F. d. S. 432).

**T. gracilis** (slender). *fl.* remote, sessile, distichous; petals oblong, slightly dilated and scarcely spreading at apex; bracts reddish at base, greenish towards the apex; panicle loose, erect, the branches erecto-patent, five to eight-flowered, 6 in. to 8 in. long; scape 2 ft. to 2½ ft. high. *l.* entire, of a pleasing green, 10 in. to 12 in. long, broad and semi-amplexicaul at base, attenuated towards the acute apex. Forests of Southern Brazil, 1886. SYN. *Vriesia gracilis* (B. G. 1886, p. 163).

**T. guttata** (spotted). *fl.* numerous, distichous, approximate; sepals citrea-coloured, with reddish marks, elliptic; petals yellow, obovate-ligulate; bracts light rose-coloured, broad, conduplicate, nearly equalling the calyx, farinose; spike simple, very long, pendulous; scape arched. *l.* short, slightly acute, mucronate, olivaceous, richly spotted and blotched with dark purple. South Brazil, 1875. SYN. *Vriesia guttata* (B. H. 1880, 1-3; I. H. n. s. 200).

**T. Hamaleana** (Hamale's).\* *fl.* sessile, bifarious, fragrant; sepals green, ovate-lanceolate; claw of petals white, linear, channelled, the limb beautiful violet, snow-white at base, rhomboid-dilated, spreading-reflexed, obcordate; bracts green and purplish, lepidote, conduplicate; spike compound, the branches distichous; spike erect, longer than the leaves, with remote, reddish bracts. *l.* approximate, divaricate, the lower ones arcuate-deflexed, the upper ones erect, linear, concave, uncinately-revolvate at apex, unarmed, not lepidote. Andes of Peru, 1870. (B. H. 1870, 5.) SYNS. *Phytarrhiza Hamaleana*, *Wallisia Hamaleana*.

**Tillandsia—continued.**

**T. heliconioides** (Heliconia-like). *fl.* sessile, distant; sepals whitish, striated, lanceolate, acuminate, concave; corolla white, tripartite, the segments lanceolate-linear; bracts striated, ovate, acute, keeled, spreading, lin. or more long; spike 4in. to 6in. long. *l.* linear-lanceolate, subulate at apex, nearly flat, glabrous, coriaceous, striated, recurved, 1½ft. long. Stem simple, scarcely 1ft. long, leafy. Rio Magdalena Valley. *SYNS.* *Vriesia bellula* and *V. Falkenbergii* (of gardens), *V. heliconioides* (G. C. n. s., xxi., p. 140; I. H. n. s. 490).

**T. hieroglyphica** (hieroglyphic). *fl.* disposed in a lax panicle; bracts ovate, conduplicate, short; panicle branches spreading, short, naked at base, bearing seven or eight pedicellate flowers. *l.* forming a tuft 3ft. to 7ft. in diameter, long, loriform, broad, especially at base, glabrous, mucronate, obtuse, green, very handsomely marked above with dark green, and below with blackish-purple. South Brazil. An exceedingly handsome foliage plant. *SYNS.* *Mossagea hieroglyphica* (R. H. 1878, p. 175), *Vriesia hieroglyphica* (B. H. 1885, 10-12; I. H. 1884, 514). For some time after it was introduced, the flowers of this species were unknown. In 1885, however, it flowered in the Brussels botanical garden, and was then found not to be a *Mossagea* at all; therefore, this species should not be referred to *Caraguata*, as mentioned under *Mossagea*.

**T. inanis** (uninteresting). A form of *T. bulbosa*.

**T. incurvata** (incurved). *fl.* yellow, tipped with green, subsessile, long-tubular; petals ligulate, the limb obtuse, recurved; bracts beautiful orange and red, conduplicate, keeled, oval-lanceolate; spike dense, stout, distichous. *l.* green, lorate, shortly acuminate, widened at base. South Brazil, 1882. *SYNS.* *T. inflata* (B. M. 6882), *Vriesia incurvata* (B. H. 1882, 2).

**T. inflata** (inflated). A synonym of *T. incurvata*.

**T. ionantha** (violet-flowered).\* *fl.* sessile, crowded at the tips of the branches; petals pale violet, convolute by their linear, broad claws; bracts lanceolate, equalling the sepals. *l.* numerous, closely imbricated, 2in. to 2½in. long, recurved, subulate-lanceolate, very coriaceous, concave above, sub-pungent at tip, the margins chollid; upper ones more erect, bright rose-coloured, at length wholly green. *h.* 3in. to 4in. Brazil (?), 1871. Plant tufted. (B. M. 5892; F. d. S. 1006.) *SYNS.* *T. crubescens* (of gardens), *Pitrophyllum ionantha*.

**T. ixioleides** (Ixia-like). *fl.* three to five in a spike, subtristichous; sepals equalling the claw of the petals; petals orange; limb only half as long as the claw; anthers included. *l.* imbricated, linear, acuminate, slightly dilated at the base, with silvery scales on the dorsal nerve. *h.* 6in. Uruguay.

**T. Jonghei** (Jonghe's). *fl.* tawny-yellow, rather remote, horizontal; sepals greenish, with fuscous margins, ovate, convex, bidentate at apex; corolla campanulate, the petals obtuse, emarginate; bracts fuscous-green, conduplicate, plicate, gibbous at base, shorter than the sepals; spike simple, acipitous, the rachis distichous-pulvinate; scape erect, simple, longer than the leaves, with lanceolate, leafy bracts. *l.* lorate, recurved, fuscous-purplish beneath. Minas Geraes, 1874. (B. H. 1874, 12-13.) *SYN.* *Vriesia Jonghei*.

**T. juncifolia** (Rush-leaved). A synonym of *T. setacea*.

**T. Karwinskiana** (Karwinsky's). *fl.* one to twelve arranged in a single lax, narrow, distichous spike; sepals glossy-green, glabrous; petals violet; scape 9in. to 12in. long. Winter. *l.* twenty to thirty in a dense rosette, 1ft. long, narrowed from a base lin. broad to a long point, pale green, lepidote on the back, nearly or quite naked on the face. Mexico, 1878.

**T. Lindenii** (Linden's).\* *fl.* axillary, sessile; sepals green, reddish at apex, lanceolate, acuminate, channelled; petals spatulate, the claw linear, the limb of a beautiful bluish-purple, spreading, ovate, sub-acuminate; stamens included; bracts very densely distichous-imbricate, cymbiform, keeled, entire, truncate at apex, smooth, the included base greenish, the outer part of a beautiful carmine; spike terminal, simple, ovate, compressed, rather shorter than the leaves, about twenty-flowered. *l.* rosulate, 8in. to 12in. long, ½in. to ¾in. broad, spreading-recurved, attenuated, acuminate, entire. Andes of Peru, 1867. A handsome species. (B. H. 1869, 13; F. M. 1872, 44; I. H. 1869, 610.) *SYNS.* *T. Morreniana*, *Phytarrhiza Lindenii*.

**T. L. intermedia** (intermediate). *fl.*, bracts green, slightly shaded with rose-colour; scape longer than in the type. 1871. An intermediate form between the type and *T. L. Regeliana*. (F. M. 1871, 529.)

**T. L. luxurians** (luxuriant). *fl.*, scapes many, axillary, elongated. 1871. (B. H. 1871, 20-21.)

**T. L. major** (greater).\* *fl.* bright azure-blue, with a white centre, much larger than in the type. 1871. (F. M. n. s. 529.)

**T. L. Regeliana** (Regel's). *fl.*, bracts green; spike narrower than in the species; scape elongated. 1877. (G. C. n. s., xii., p. 461.) *SYN.* *T. Lindeniana* (R. G. 1869, 619).

**T. Lindeniana** (Linden's). A synonym of *T. Lindenii Regeliana*.

**T. Malzinei** (Omer de Malzine's). *fl.* twelve to twenty in a dense, simple, multifarious spike; petals white, lingulate, twice as long as the calyx, with a pair of white, imbricated scales at the base; bracts yellow or red, ovate-navicular, above lin. long. April. *l.* fifteen to twenty in a dense rosette, about 1ft. long, 3in. broad

**Tillandsia—continued.**

at the dilated base, falcate, chartaceous, deltoid-cuspidate at apex, bright green on the face, red-brown with fine vertical lines at back. Mexico, 1874. Acaulescent. (B. M. 6495.) *SYN.* *Vriesia Malzinei* (B. H. 1874, 14).

**T. monadelpha** (monadelphous). *fl.* about twenty, whitish, tinged with light purple, rather remote, sub-sessile; petals spatulate, the limb spreading; stamens monadelphous at base; bracts conduplicate, green, tinged with yellow, shining; spike simple, loose, the rachis distinctly pulvinate, green; scape erect, longer than the leaves. *l.* numerous, broad and green at the base, above arcuate, lanceolate, acute, purple on both sides. Guiana, 1882. *SYN.* *Phytarrhiza monadelpha* (B. H. 1882, 7).

**T. Morreni** (Morren's).\* *fl.* second, one sessile in the axil of each viscid, brown bract; calyx light brown, about twice the length of its bract; petals yellowish-green, very narrow; panicle pyramidal; bracts straw-coloured. *l.* two, 2½in. broad, erect, 1½ft. long, sub-coriaceous, with broken, zigzag, transverse markings; tip rounded, minutely mucronate. *h.* 15in. Brazil.

**T. Morreniana** (Morren's). A synonym of *T. Lindenii*.

**T. muscosa** (mossy). A garden synonym of *Pitacirhia muscosa*.

**T. narthecoides** (Narthedum-like). *fl.* yellowish-white, inconspicuous, distant, nearly horizontally spreading; bracts glabrous, as long as the calyx, oblong, striated; spike 4in. long, erect, simple; scape 6in. high, erect. *l.* linear, flat, 8in. long, ½in. broad, subulate at apex, dilated at base. Guayaquil, 1878.

**T. nitida** (shining). A synonym of *Catopsis nitida*.

**T. parahiba** (Parahiba). *fl.* in a densely-imbricated, distichous spike; bracts large, purple-red, as long as the golden-yellow calyx; petals yellow, much longer than sepals. Summer. *l.* green, shining, lingulate, 6in. to 9in. long, about ½in. wide, about as long as the scape. *h.* 6in. to 9in. Brazil, 1885.

**T. paucifolia** (few-leaved). A synonym of *T. bulbosa*.

**T. Philippo-Coburgi** (Prince Philip of Saxe-Coburg's). *fl.* distant, second; calyx golden-yellow; petals greenish, protruding at the summit of the calyx a third longer, the included part folded into a very narrow tube; panicle pyramidal, the branches red; lower bracts large, dark red; bracteoles bright red, scarious, clasping at the base, oblong-lanceolate, very acute. *l.* 2½in. broad, rigidly membranous, light green, shining, the apex reddish-brown; sheath slightly dilated, variegated with pale purplish blotches. *h.* 15in. Brazil. *SYN.* *Vriesia Philippo-Coburgi*.

**T. picta** (painted). A garden synonym of *T. splendens*.

**T. Platzmanni** (Platzmann's). *fl.* yellow, distichous, rather remote, shortly pedunculate, tubular; sepals fuscous at base, convolute in a tube; petals also convolute; bracts purplish, navicular; spike simple, second, about ten-flowered; scape 3ft. to 4ft. high, slender, erect, bracteate. *l.* lingulate, broad at base, green, margined with red. South Brazil, 1875. *SYN.* *Vriesia Platzmanni* (B. H. 1875, 23).

**T. polystachya** (many-apiked). *fl.* sessile; calyx bipartite; petals blue, rarely white, linear, channelled-concave, acuminate; bracts scarlet, imbricated above; spikes numerous, the lateral ones about ten, 1ft. long, alternate. June. *l.* linear-subulate, acuminate, entire, channelled, broad and ventricose at base, the lower ones 2ft. long. Stem leafy, erect, 3ft. high. West Indies, &c., 1825.

**T. polytrichoides** (Polytrichum-like). A synonym of *T. bryoides*.

**T. pruinosa** (pruinose). *fl.*, sepals seven to eight lines long, all distinct; petals blue, fourteen to sixteen lines long, convolute, spreading at the summit, spatulate above the claw; bracts rose-coloured, lin. long, distichous, approximate, ovate-oblong, pointed; spike simple, 2in. to 3in. long. *l.* convolute-fliform from a subulate base, recurved, as long as the stem. *h.* 4in. to 6in. West Indies, Brazil, &c. Plant wholly covered with spreading, white scales. (B. H. 1876, 16-17.)

**T. psittacina** (parrot-like).\* *fl.* large, remote, distichous; petals green at the point, rather longer than the bracts, which are bright red in the lower part, and deep yellow above; rachis red; scape 1ft. or more high. July. *l.* radical, 6in. to 8in. long, linear-ligulate, much inflated, recurved, acute, entire, yellow-green, thin more or less waved. Forests near Rio Janeiro, 1828. (B. M. 2841.) *SYN.* *Vriesia psittacina* (B. H. 1882, 10-12; B. R. xxix, 10). Morren unites with this *T. carinata* as a variety.

**T. psittacino-carinata** (hybrid). A good and handsome garden hybrid, having more numerous and approximate flowers than *T. psittacina*. 1883. *SYN.* *Vriesia Morreniana* (B. H. 1882, 10-12, f. 2.)

**T. psittacino-scalaris** (hybrid). *fl.* as in *T. psittacina*, ten to fifteen on a reflexed rachis; internodes short; scape arcuate, dependent. 1885. Habit stouter than *T. scalaris*. *SYN.* *Vriesia retroflexa* (B. H. 1884, 10.)

**T. pulchella** (pretty). A synonym of *T. pulchra*.

**T. pulchra** (beautiful).\* *fl.*, calyx greenish-white; petals quite white; bracts of a beautiful, delicate red, imbricated and sheathing, almost entirely concealing the flowers; scape, including the spike, about as long as the leaves. *l.* 4in. to 6in. long, quite subulate, hoary with a minute, scurfy pubescence, channelled,

**Tillandsia**—continued.

especially towards the base. South Brazil, &c., 1840. Plant tufted. SYNS. *T. pulchella* (B. H. ix. 322; B. M. 5229), *Pourretia surinamensis* (of gardens).

**T. p. amœna** (pleasing). *fl.*, sepals pink; petals much longer, with a white claw and a lilac limb; spike few-flowered; scape erect, sheathed by pink bracts. *l.* narrow-subulate. Stem branched flexuous. SYN. *Anoplophytum amœnum* (B. H. 1883, 17).

**T. pumila** (dwarf). A form of *T. bulbosa*.

**T. recurvata** (recurved). *fl.*, sepals about three-fourths as long as the blue corolla; petals naked within, spreading above the calyx; peduncles axillary or terminal, sub-solitary, exserted, two to five-flowered; spike included by a sheathing bract, each flower by a smaller bract, the upper ones somewhat distant. *l.* 2in. to 3in. long, filiform, recurved. Stems tufted. Scaly down spreading. *h.* about 6in. Tropical America, 1793. SYN. *T. cordobensis*.

**T. recurvifolia** (recurved-leaved). A synonym of *T. dianthoidea rosea*.

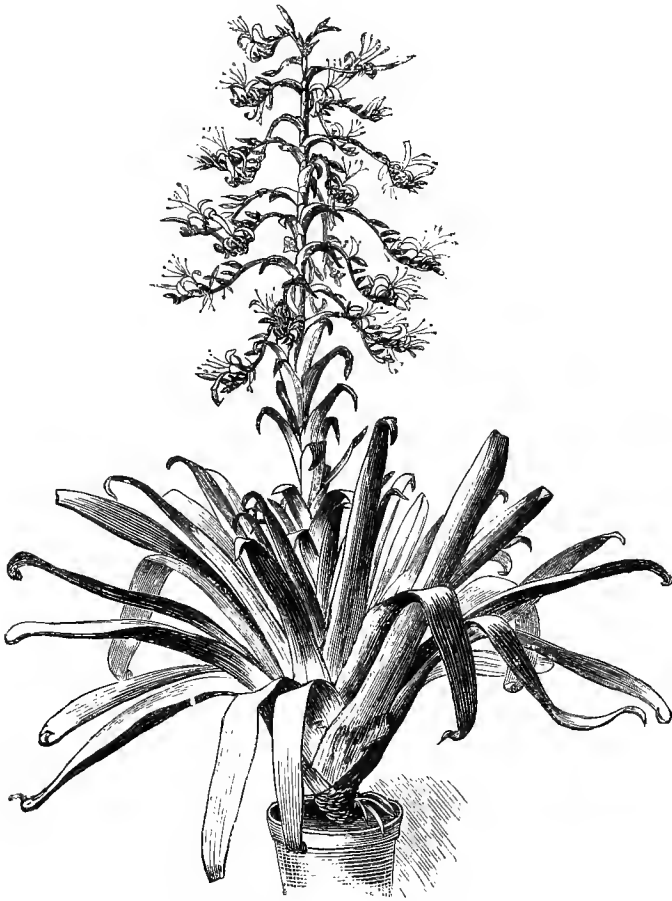


FIG. 38. TILLANDSIA REGINA.

**T. regina** (queen).\* *fl.* white, exhaling a strong, jasmine-like perfume; bracts rose-coloured; spikes two-ranked, curved, disposed in a branched panicle; scape developing very rapidly, eventually attaining a height of about 7ft. *l.* about 4ft. long, recurved at apex, broadly sheathing at base. South Brazil, 1867. A magnificent plant. See Fig. 38. SYNS. *Vriesia gigantea*, *V. Glazioviana*, *V. regina* (G. C. n. s., iii., p. 235). *T. gigantea* is merely a form of this species.

**T. reticulata** (netted-leaved). *fl.* in a paniculate inflorescence, 1ft. or more long; calyx greenish, 1½in. long; petals milk-white, ½in. longer than the calyx; stamens longer than petals. Spring. *l.* lorate-lanceolate, 1½in. to 2ft. long, in a dense rosette, 3in. above the dilated base, moderately firm in texture, nearly naked on both sides, copiously reticulated with fine transverse lines of dark green on a pale green ground. *h.* 1½ft. to 2ft. Rio Grande do Sul, 1870. SYNS. *Guzmania reticulata*, *Vriesia reticulata*.

**T. revoluta** (revolute). A synonym of *T. Duratii*.

**Tillandsia**—continued.

**T. Rodigasiana** (Rodigæ). *fl.* citron-yellow, distichous, remote, sub-sessile, spreading, tubular; sepals obtuse; petals thrice as long as the sepals, ligulate, the limb arcuate; bracts tinged with red, striated, ovate, short; panicle loose, elongated, elliptic, the branches spreading, few-flowered, nearly sessile, springing from a short, scarlet spathe; scape elongated, erect, slender, with narrow bracts. *l.* short, arcuate-spreading, broadly sheathing and fuscous at base, the blade loriform, slightly channelled, rounded-cuspidate, green, with a few dark blood-coloured markings. South Brazil. Closely allied to *T. gracilis*. SYN. *Vriesia Rodigasiana* (I. H. u. s. 467.)

**T. Roezlii** (Roel's). *fl.* rosy; spikes distichous, ancipitous, elliptic, forming a tall panicle. *l.* large, linear, acute, dark green, with large, black blotches on the upper part, the margins incurved. Andes of Northern Peru, 1877. A plant of bold habit. (B. H. 1877, 15.)

**T. rosea** (rosy). A synonym of *T. dianthoidea rosea*.

**T. rubida** (reddish). A synonym of *T. geminiflora*.

**T. sanguinolenta** (blood-red). *l.* deflexed at the apex, with numerous irregular blotches of dark blood-red on both surfaces. *h.* 9in. to 12in. New Granada, 1875. As the flowers of this species are unknown, it has been impossible to place it in the key, or even to state with certainty whether it is really a *Tillandsia* or no. SYN. *Encholirion sanguinolenta* (I. H. 1875, 200).

**T. Saundersii** (Saunders).\* *fl.* sulphur-yellow; sepals equitant, oblong, concave; panicle loose, the primary raceme few-flowered, divaricate, bracteate; scape erect, shining, angled, yellowish-white. *l.* rosulate, short, deeply and broadly sheathing at base, linear, obtuse, decurved, coriaceous, above greyish-green, slightly dotted with white, below striated and spotted with blood-colour. *h.* 1½ft. Brazil, 1872. SYN. *Encholirion Saundersii* (I. H. u. s. 132).

**T. scalaris** (ladder-like). *fl.* very long and pretty; calyx yellow; corolla green; bracts of a deep rose-colour; scape 1½ft. to 2ft. long, hanging from the plant like a rope ladder. *l.* ligulate, about 10in. long, green, ciliated. South Brazil, 1879. SYN. *Vriesia scalaris*.

**T. setacea** (hristly). *fl.*, sepals half as long as the corolla; petals bluish-purple, spatulate, 1in. long, spreading at the summit; bracts lepidote, imbricate-distichous, ovate-oblong, pointed, as long as the sepals; spike 2in. to 3in. long, compressed, simple, or with a few short, appressed branches at the base. *l.* convolute-filiform, little or gradually dilated at base, sub-erect, equalling or exceeding the scape. *h.* 8in. to 18in. West Indies to Brazil, 1825. (Ref. B. 283.) SYNS. *T. juncifolia* (R. G. 811), *T. tenuifolia* (of Linneus), in part (B. H. 1876, 14).

**T. setacea** (bristly), of Hooker. A synonym of *T. anceps*.

**T. speciosa** (showy). A garden synonym of *T. splendens*.

**T. splendens** (splendid).\* *fl.*, calyx free, the sepals oblong-lanceolate; petals yellow, free, linear or linear-oblong, slightly dilated-spatulate at apex, thrice the length of the calyx; bracts fiery-purple, lanceolate, acute, keeled, oblique, closely imbricated; spike simple, distichous, compressed, ancipitous, linear-lanceolate, longer than the scape; scape erect, simple, longer than the leaves, the closely appressed scales green, fuscous-spotted. *l.* eight to twelve, linear-oblong, concave at base, nearly 2ft. long, 3in. broad, flat and abruptly narrowed towards the recurved apex, of a pleasing green above, lighter beneath, with transverse, dark fuscous zones. French Guiana. See Fig. 39. (F. d. S. May, 1846, 4.) SYNS. *T. picta*, *T. speciosa*, and *T. zebrina* (of gardens), *Vriesia splendens*.

**T. staticiflora** (Statice-flowered). A synonym of *T. filifolia*.

**T. streptophylla** (twisted-leaved). *fl.*, calyx ½in. long, hidden; corolla bright lilac, cylindrical, ½in. long; bracts densely lepidote, much imbricated; spikes four to eight in a short panicle; peduncle short, hidden by its numerous red-tinted, lepidote, imbricated, bract-like leaves. *l.* in a dense, basal rosette, the erect, dilated base 3in. long and broad; blade 6in. to 9in. long, 1in. broad at base, gradually tapering to a long point, much twisted spirally from low down, densely lepidote. Jamaica, &c., 1878. (B. M. 6757.) SYN. *T. circinata*.

**T. stricta** (erect). *fl.* narrow-cylindrical, about ½in. long; calyx pale reddish-brown; corolla deep violet-blue above the calyx, finally deep red; bracts white, red-tinged, slightly pellicud; scape about 7in. high. November. *l.* springing from a short, fleshy rootstock, about 6in. long, nearly ½in. broad at the base,

**Tillandsia**—continued.

coated with hoary pubescence. Brazil, &c., 1810. (B. M. 1529.) SYN. *Anoplophytum strictum* (B. H. 1878, 13).

**T. s. caulescens** (caulescent). This only differs from the type in its stem being decidedly developed, and, consequently, in the greater stature of the plant.

**T. stricta** (erect), of Lindley. A synonym of *T. dianthoidea*.

**T. tectorum** (growing on roofs). *fl.*, sepals free, lanceolate, conduplicate; petals white, blue in the middle, convolute in a tube which broadens towards the apex; bracts light green, tinged with rose, lanceolate, conduplicate, rather shorter than the sepals; spikes distichous, acipitous, short, forming a short, contracted panicle; scape erect, tall, its bracts rosy at base. *l.* very numerous, imbricated, lanceolate-linear, spreading, arched, scarious-pilose; sheath very broad, gradually attenuated into the limb. Stem elongated, ascending, leafy. Andes of Peru, 1865. (B. H. 1877, 18.) SYNS. *T. argentea* (of K. Koch), *Pourretia nivosa* (of gardens).

**T. tenuifolia** (slender-leaved), of Jacquin. A synonym of *T. flexuosa*.

**T. tenuifolia** (slender-leaved), of Linnæus. A synonym of *T. setacea*.

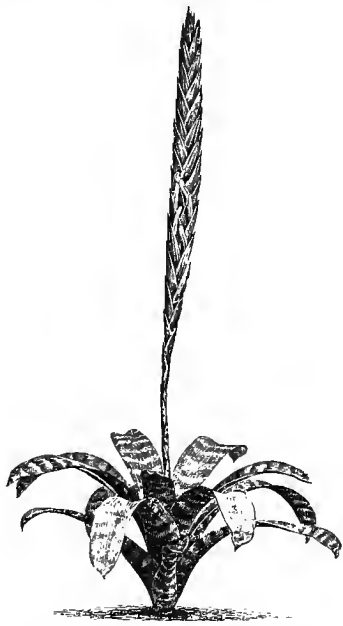


FIG. 39. *TILLANDSIA SPLENDENS*.

**T. tessellata** (tessellated). *fl.*, sepals green, glutinous; petals yellow, forming a campanulate corolla; bracts green; panicle tall, erect, loose, the branches erect, arcuate, each bearing nine to twelve sub-sessile flowers; scape equalling the leaves, furnished with navicular bracts. *l.* coriaceous, rigid, channelled, tessellated in green and yellow, sub-glaucous, acuminate at apex, the sheath broad, dark fuscous. South Brazil, 1882. SYN. *Vriesia tessellata* (B. H. 1882, 14-16).

**T. tricolor** (three-coloured). A synonym of *T. anceps*.

**T. umbellata** (umbellate).\* *fl.* sapphire-blue, white in the centre, five or six opening simultaneously; calyx green; bracts light green, as large as the sepals; inflorescence a very short, acipitous spike. Winter. *l.* 9 in. to 12 in. long,  $\frac{1}{2}$  in. broad, light green, shortly sheathing at the base, ascending, spreading, filiform, acute at the tips, smooth and glossy. *h.* 1 ft. Ecuador, 1882. (R. H. 1886, p. 60.) A near ally of *T. Lindenii*.

**T. usneoides** (Usnea-like). Long Moss; Old Man's Beard; Spanish Moss, of the West Indies. *fl.* green, solitary, terminal, about  $\frac{1}{2}$  in. long; sepals tinged with red. July. *l.* alternate, bifarious, uniform throughout, spreading, 1 in. to 3 in. long, filiform, grooved above; sheaths  $\frac{1}{2}$  in. to 2 in. long, cylindrical. Tropical America, 1877. Plant forming loose, pendulous tufts, sometimes many feet long, clothed everywhere with a spreading, silvery scurf. (B. H. 1877, 17; B. M. 6309.)

**T. utriculata** (bladder-like). *fl.*, sepals green, reddish-margined, half as long as the corolla; petals greenish-white, spreading at the summit; bracts green, reddish-margined, distichous, erect, oblong, blunt, longer than the internodes; spike compound, the branches long and distant. *l.* linear, acuminate, gradually taper-

**Tillandsia**—continued.

ing from an ovate base, spreading, recurved at the top, shorter than the stem. West Indies, &c., 1793

**T. vernicosa** (polished). *fl.* white; spikes panicled; distichous; peduncle under 6 in. long. *l.* few, ensiform, polished. Parana, 1887.

**T. vestita** (clothed). *fl.* yellow, forming a long, cylindrical tube, exerted about 1 in. from the red calyx; spike simple, few-flowered. May. *l.* linear-subulate. *h.* 6 in. Mexico, 1886.

**T. viminalis** (twiggy). *fl.* white,  $\frac{1}{2}$  in. long,  $\frac{1}{2}$  in. in diameter; petals oblong, obtuse, forming a campanulate corolla; bracts green; spike simple, distichous, dense, fusiform; scape twiggy, 2 ft. high, covered with scarious bracts. *l.* in a large, open rosette, membranous, shining, ligulate, acute, recurved, entire, 1 ft. long,  $\frac{1}{2}$  in. to 2 in. broad. Costa Rica, 1878. SYNS. *T. viridiflora* (of gardens), *Vriesia viminalis* (B. H. 1878, 14-15).

**T. virginalis** (fragile).\* *fl.* sessile; sepals green, included; corolla claviform, ample, the petals white, obovate; bracts green, conduplicate, ample, farinaceous; spike simple, distichous, elliptic, acipitous. *l.*, primordial ones filiform; the rest lorate, with a broad sheath, pale green, farinaceous. Mexico, 1873.

**T. viridiflora** (green-flowered). *fl.*, petals green, fugacious; spike simple, dense, 12 in. long; bracts 2 in. to 2  $\frac{1}{2}$  in. long; peduncle  $\frac{1}{2}$  ft. to 2 ft. long. Summer. *l.* twelve or more, about 1 ft. long, lorate. Mexico, 1887.

**T. viridiflora** (green-flowered), of gardens. A synonym of *T. viminalis*.

**T. Warmingii** (Warming's). *fl.* yellow, rather distant, numerous, distichous, erecto-patent, tubular; petals ligulate, revolute at apex; bracts golden-yellow, tipped with green, coriaceous, ovate, closely covering the flowers; spike long, simple, the rachis rigid; scape 3 ft. to 4 ft. high. *l.* coriaceous, about 3 ft. long and 2 in. broad, slightly spreading, green, marbled and tinged with dark rose-colour, especially in the lower part, the sheath broad. South Brazil, 1884. SYN. *Vriesia Warmingii* (B. H. 1884, 12-13).

**T. Wawraea** (Wawra's). *fl.* ten to twelve, arranged distichously at the summit of a scape, which is clothed with green, adpressed bracts, and is somewhat shorter than the leaves; calyx green; petals waxy-yellow, pointed, recurved; filaments and pistil shorter than the petals. Summer. *l.* 18 in. long,  $\frac{2}{3}$  in. to 3 in. wide, glaucous, bluish-green, with fine, transverse, wavy lines, a dark brown blotch just under the mucro, and dark chestnut-brown at the base; rosette with about a score leaves. *h.* 1 ft.

**T. xiphioides** (Xiphion-like).\* *fl.* snow-white, numerous; sepals linear-lanceolate, acuminate; petals with a slender, linear claw, 1 in. long, and a broadly obovate, acuminate, reflexed, crisped blade; bracts 2 in. long, closely lubricated; spike 3 in. to 4 in. long, reflexed, distichous; scape long or short. May. *l.* crowded, rosulate, 4 in. to 6 in. long,  $\frac{1}{2}$  in. broad at base, broadly subulate, with recurved margins that are involute at the tip. Argentine Republic and Uruguay, 1810. Plant covered with silvery-grey tomentum, deliciously scented, and remarkably pretty. (B. M. 5562; B. R. 105.)

**T. xiphostachys** (dagger-spiked).\* *fl.* deep rich purple, only one opening at a time; bracts green, becoming tinged with bright yellow, and bright red towards the base, closely placed, sharply cymbiform; spike singularly flattened, solitary, 6 in. long, 1 in. broad. August. *l.* 9 in. to 12 in. long, from a broad, convex base, gradually tapering to a subulate point, entire, dark glaucous-green; lower ones purplish at base. Mexico and Venezuela 1861. SYNS. *T. complanata* (B. H. 1872, 23), *Vriesia xiphostachys* (B. M. 4287).

**T. zebrina** (zebra-striped). A garden synonym of *T. splendens*.

**TILLETTIA** (named in honour of Matthieu Tillet, a French botanist of the eighteenth century). A genus of Fungi, parasitic on grasses. The most conspicuous species (*T. Caries* = *T. Tritici*) is found in the ovaries or immature fruits of the various kinds of Wheat, which it fills with a mass of dark brown spores. Externally, the grains look quite healthy, or may be distinguished from the ripe fruits only by their dull green colour; but their whole interior is occupied by the spores of the Fungus, and, on being crushed, they are found to be greasy to the touch, and to emit a disagreeable smell. Under the microscope, the spores are seen to be globular, with a network of ridges over the surface. The diseased condition of the Wheat is known to farmers by the names "Bunt," "Stinking Rust," "Stinking Smut," or "Pepper-brand." On germinating, each spore emits a thread of mycelium, which bears on its tip a circle of slender conidia, united in pairs by cross-branches. The conidia fall, and produce mycelium, on which grow other conidia, from which mycelium is emitted; and on this the spores are formed. Several other species of *Tilletia* grow in the ovaries of grasses, e.g., *T. Lolii* in *Lolium remotum*, *T. Secalis* in Rye (*Secale cereale*), &c.; while others form dark brown streaks in

**Tilletia**—continued.

the leaves of several grasses; *T. striiformis* is the commonest of the latter species. It has been asserted, but not confirmed, that the use of hunted meal causes disease.

**Treatment.** The infected grain may be steeped in solutions, e.g., of 1 per cent. of carbolic acid in water, or of potassium permanganate, or of sodium sulphate; in the latter case, it should then be dusted with quicklime, and allowed to dry.

**TIMMIA.** A synonym of **Cyrtanthus** (which see).

**TINANTIA** (called after Tinant, a Belgian botanist).

ORD. *Commelinaceæ*. A small genus (three species) of stove or hardy, erect herbs, natives of tropical America. Flowers pedicellate at the sides of the branches; cyme on a terminal peduncle. Leaves mediocre or ample. The under-mentioned plant is a half-hardy, perennial herb, closely allied to *Tradescantia*. It thrives in any well-drained, loamy soil. Seeds may be either sown in a warm, sunny spot in the open ground, in spring, or germinated in heat, and the seedlings hardened off and planted out; but it also thrives as a greenhouse plant.

**T. fugax erecta** (fugacious, erect). *fl.*, petals blue or purplish; pedicels conspicuously bracteolate at base; peduncle villous, one to three-parted at apex, the branches umbellate. July. *l.* ovate-lanceolate, pilose above, glabrous beneath, narrowed at base, slightly petiolate, longitudinally striated. Stem glabrous. *h.* 1½ ft. 1794. **SYNS.** *Tradescantia erecta* (B. M. 1340), *T. latifolia* (L. B. C. 1300), *T. undata* (B. R. 1403).

**TINEA** (of Sprengel). A synonym of **Prockia** (which see).

**TINEINA** (from *tinea*, a clothes-moth). A very extensive division of small **Moths** (which see), most of which may be readily distinguished from the division **Tortricina** (which see) by the narrow wings, almost always fringed with long scales on the inner and hind margins, the hairless eyes, the thickened bases of the antennæ, and the upturned terminal joints of the palpi. They differ very greatly among themselves in form, colour, and habits, and even in size, some of the larger ones measuring nearly 1 in. across the fore wings, while many of them do not exceed ¼ in. across; in fact, the smallest known species of **Moths** belong to this division. The number of species is very great; and it is not possible to enter into details with regard to them individually. Hence, special reference must be confined to only a few of the species of most importance to horticulturists.



FIG. 40. SMALL ERMINE MOTH (*Hyponomeuta padella*).  
Twice natural size.

Most of the larvæ have six true legs, and ten suckers or prolegs; but in one genus there are twelve suckers, in others only eight, and in some the larvæ are entirely footless, and live in burrows in the leaves or other organs of plants. Some of the larvæ feed on the surface of the plants, exposed to view, or protected by a case fitting closely around the body. Most of them, however, live concealed, either in webs or in masses of flowers and seed vessels spun together, or, as already mentioned, in burrows in stems, leaves, or fruits; and some are but too well known because of their ravages on clothes, and on articles of furniture.

Among the genera most destructive in gardens is *Depressaria*, several species of which are hurtful to Carrots and Parsnips, and are described among the insect foes

**Tineina**—continued.

of these plants. Some of the species in this genus reach a span of nearly 1 in. across the fore wings, and are thus among the largest of the *Tineina*. The genus *Tinea* includes a considerable number of species, several of which feed in clothes, in furniture, or on Cereals, &c., stored in granaries and warehouses; but none are conspicuously hurtful in gardens. An account of *Hyponomeuta padella*, and its ravages on Hawthorn, is given under **Hawthorn Caterpillars**. The genus *Hyponomeuta* includes a few species, all easily recognised by three or four longitudinal rows of black dots on the white or grey fore wings (see Fig. 40); but the larvæ of *H. padella* alone are ever seriously injurious in gardens. Their

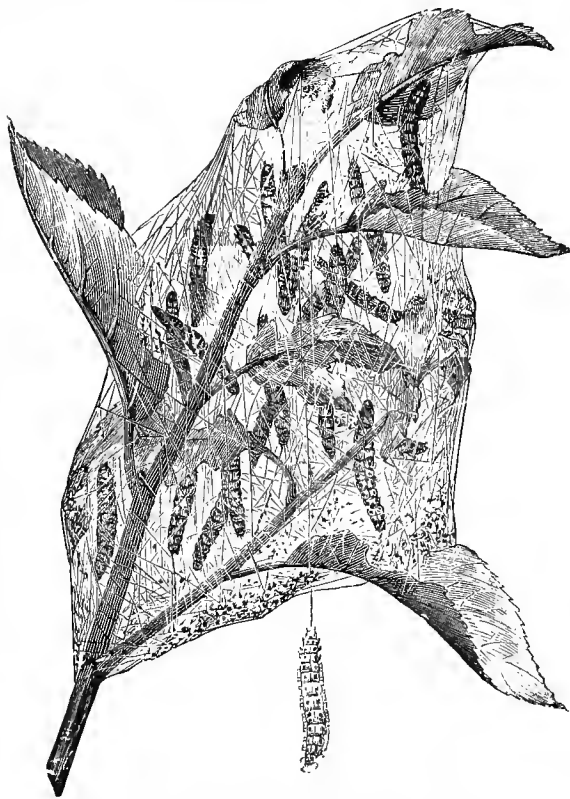


FIG. 41. LARVE AND WEB OF SMALL ERMINE MOTH  
(*Hyponomeuta padella*).

habit of living in society, in a web (see Fig. 41) renders them very conspicuous, and it is easy to remove and destroy entire colonies. **Plutella cruciferarum** (which see) does a good deal of harm to Cabbages and Turnips. *Endrosis fenestrella* is one of the most abundant of clothes-moths in houses, appearing almost throughout the year. It may be known by the snowy-white head and thorax, and dirty-grey wings, clouded with darker markings. The leaf-miners are very numerous; indeed, there are few trees or shrubs that are not infested by several, or even by many, species; and there are also many leaf-miners that burrow in the leaves of herbs of various kinds: e.g., several live in *Epilobium angustifolium* and its congeners. The mines and blotches produced by these insects render the leaves unsightly, but are seldom so numerous as to materially weaken the plants.

**Treatment.** If the plants are suffering from the abundance of leaf-mining larvæ upon them, or if their beauty is



**Tineina**—*continued*.

materially impaired thereby, the mined leaves should be picked off with the larvæ still in them; or the larvæ may be crushed in the leaves between the finger and thumb. The habits of life of other injurious *Tineina* are so various that no general statement of treatment would be of much service, and reference should be made to the methods advised under the special headings quoted above.

**TINNEA** (named in honour of Mdle. Tinné, Nile voyager). ORD. *Labiata*. A small genus (four or five species) of tall, pubescent or woolly, stove herbs or under-shrubs, natives of tropical Africa. Flowers fuscous- or violet-purple, fragrant; calyx ovoid, bilabiate; corolla tube short and broad, the limb sub-bilabiate, the upper lip emarginate or two-lobed, the lower one much longer and spreading; stamens four; whorls often loose, two-flowered, axillary or disposed in a terminal raceme; pedicels bi-bracteolate. Leaves entire; floral ones conformed, the upper ones reduced to bracts. Only one species has been introduced. It thrives in any light, rich soil. The plants should be grown in a light, airy place, and frequently pinched to induce a bushy growth. Propagation may be effected by cuttings, which root readily.

**T. æthiopica** (African). \* fl. copiously produced in the upper axils, two or three to a peduncle; corolla dark maroon-purple, the broad tube a little longer than the calyx. Winter. l. on short, slender petioles, ovate, sub-acute or acute, quite entire, narrowed at base. Stems and branches erect, terete, ribbed, twiggy. h. 4ft. to 6ft. 1867. A hoary sub-shrub. (B. M. 5637.)

**T. æ. dentata** (toothed). fl., calyx large, cylindrical, two-lipped, inclosing the whole of the corolla tube. l. opposite, elliptic, slightly toothed. 1884. (B. M. 6744.)

**TINUS**. Included under **Viburnum** (which see).

**TIPULA**. See **Tipulidæ**.

**TIPULARIA** (from *tipula*, a Daddy-long-legs; in allusion to the shape of the flower). SYNS. *Anthericlis*, *Plectrurus*. ORD. *Orchidæ*. A small genus (two closely-allied species) of terrestrial Orchids; one is North American, and the other Himalayan. Flowers rather small, loosely racemose, pedicellate; sepals and petals free, narrow; lip sessile, with small lateral lobes and a flat middle one. Leaves ovate. The species have no horticultural value.

**TIPULIDÆ**. A family of two-winged flies (*Diptera*) distinguished by the long, slender body, with long, unarmed legs, and long, rather narrow wings, with many veins. There is a distinct furrow on the back of the thorax, between its front and middle segments. The head is usually rather small and round, and bears rather long antennæ, which have from six to nineteen joints. One of the commonest species, the Common Crane Fly

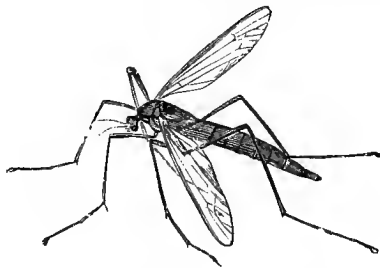


FIG. 42. *TIPULA OLERACEA*.

(*Tipula oleracea*), is shown, of the natural size, at Fig. 42. The larvæ of *Tipulidæ* are popularly known as "grubs," and under that name are but too well known to farmers, as they are among the worst enemies of the cultivated crops, and of pastures. They are dirty-grey,

**Tipulidæ**—*continued*.

cylindrical maggots, with no distinct head or feet. The rings are separated by shallow grooves. The body is blunt behind, but bears six small, fleshy tubercles on the blunt end. The "grubs" are clumsy creatures, and move slowly, but are protected from injury by their tough skin, which has procured them the name of "Leather-jackets" in some localities. They are of various sizes, when full grown, as there are numerous species. The larvæ of *T. oleracea* reach a length of over lin., with a thickness of about  $\frac{1}{16}$  in. They live in the soil, a little way below the surface, feeding on the roots of grasses and other plants. When numerous, they not unfrequently destroy the grasses on lawns, or devour great part of the garden and field crops. The produce of damp soil is peculiarly apt to suffer from their ravages. When full fed, they change into pupæ, which are of nearly the same size as the larvæ, but are provided with cases on the front part of the body for the wings and legs of the future Crane Fly. The rings of the abdomen of the pupæ each bear a transverse row of short, stiff spines; and, by means of these, the pupæ can wriggle partly out of the soil, just before the flies are ready to break out, to permit their more easy exit. There are many species of *Tipula*, but there is no need to describe them in detail, as all show much the same habits, and must be combated by the same methods.

**Treatment.** The female flies are prevented from laying eggs, and the larvæ may be destroyed, by the employment of dressings of such materials as gas lime or soaper's ashes. Common salt has also been found useful, in the proportion of about half a ton to the acre, just before the ground is ploughed. Deep ploughing is very beneficial. To enable the crops to resist attacks, the most effectual method is to stimulate growth by dressings of guano or other manures, so as to render the plants less liable to serious injury, even if partially eaten. The use of heavy rollers has been recommended for lawns, and this would probably kill those grubs that lie close to the surface; but they are not very liable to injury from pressure, unless it is very considerable.

**Traps**, as recommended under **Crane Fly** (which see), consisting of slices of turnip, potato, or other fleshy roots or tubers, may be employed with success for the protection of choice plants or crops. They should be sunk a few inches below the surface of the soil, and be examined every two or three days, the grubs found in them being removed and destroyed.

Certain birds, especially starlings and rooks, are very useful in reducing the number of grubs, of which they eat multitudes: they ought, therefore, to be encouraged. Among the most productive breeding-grounds of grubs (as well as of other pests of gardening and of agriculture) are uncultivated corners or edges of shrubberies and fields, where weeds are allowed to grow unchecked from year to year. It is advisable to get rid, as thoroughly as possible, of such sources of trouble.

**TISSUE.** The material of which the elementary organs of plants are constructed, whether consisting of membranes, bladders, cells, or fibres.

**TITHONIA** (a name of mythological derivation, from Tithonus, the favourite of Aurora). ORD. *Compositæ*. A small genus (four or five species) of half-hardy, robust, annual herbs, or sometimes shrubby at base, natives of Mexico, Central America, and Cuba. Flower-heads yellow, large, heterogamous, on long, thickened peduncles; ray florets ligulate, spreading, entire or scarcely bidenticulate; involucre hemispherical or broadly campanulate, the bracts biseriate; receptacle convex; achenes slightly pilose. Leaves alternate, petiolate, entire or three-lobed. The species here described thrive in any light soil. Propagated by seeds.



**Tithonia**—continued.

**T. ovata** (ovate). A synonym of *Zexmenia ovata*.

**T. speciosa** (showy). *fl.* heads, involucre bracts leafy; ray florets about twelve or thirteen, rich red; peduncles one-headed, thickened above. August. *l.* petiolate, cordate, undivided or crenately three-lobed. Stem erect, terete. *h.* 4ft. Mexico, 1833. *SYN. Helianthus speciosus* (B. M. 3295).

**T. tagetiflora** (Marigold-flowered). *fl.* heads orange-yellow; ray florets oval-oblong; involucre velvety, erect; peduncles thickened at apex. August. *l.* usually trilobed. *h.* 6ft. Vera Cruz, 1818. (B. R. 591; R. H. 1858, f. 64.)

**T. tubæformis** (tube-like). *fl.* heads, ray florets oblong; involucre hairy, somewhat spreading; achenes usually biaristate; peduncles thickened at apex. July. *l.* all undivided. *h.* 5ft. Mexico, 1799. (B. R. 1519, under name of *Helianthus tubæformis*.)

**TITHYMALUS**. A synonym of *Euphorbia* (which see).

**TITRAGYNE**. A synonym of *Rohdea* (which see).

**TITTMANNIA** (of Reichenbach). Included under *Vandellia* (which see).

**TOAD** (*Bufo vulgaris*). There are few more useful animals in a garden than the common Toad, despite the prejudices with which it has so long been regarded, and which are, even yet, hardly extinct in some minds. It is, however, scarcely necessary, in the present day, to waste words to disprove the belief, so widely prevalent in the past, that the Toad is venomous. It is perfectly harmless to human beings. It is of much value in a garden, from the fact that it feeds largely on insects and slugs. During the day, Toads shelter themselves under stones, or in holes in the soil; or, in default of these, they will retreat to the shade of broad-leaved plants. The night is their time for movement and for taking food; though a dull, wet day will also tempt them out. Despite the slowness of their motions, they are able to capture the most active insects. This is done by means of the tongue, which can be shot forth from the mouth to a surprising distance.

**TOADFLAX**. See *Linaria*.

**TOAD FLOWER, AFRICAN**. A common name for several species of *Stapelia*.

**TOAD STOOL**. A common name for poisonous Fungi.

**TOBACCO**. See *Nicotiana Tabacum*.

**TOCOCO** (Tococo is the name of *T. guianensis* in Guiana). Including *Sphærogyne*. *ORD. Melastomaceæ*. A genus comprising about thirty species of glabrous or hispid-pilose, stove shrubs, natives of North Brazil, Venezuela, and Guiana. Flowers white or pink, rather large, paniculate, naked or included in ample bracts; calyx tube terete or costate, the limb dilated, five or six-lobed; petals five or six, obovate or oblong, obtuse or reflex; stamens ten or twelve, equal. Leaves petiolate, ample, membranous, rarely coriaceous, entire or denticulated, five-nerved, often having on the base or on the petiole a two-lobed, inflated bladder. The species known to cultivation are here described. They thrive in a compost of one part sandy loam and two parts rough peat. Cuttings of side shoots should be inserted in February.

**T. ferruginea** (rusty). *l.* three-ribbed, elliptic-oblong, shortly acuminate, shaded green on the upper surface, paler beneath, the younger ones stained with red. Stem terete, clothed with cinnamon-coloured scurf. South America, 1868. *SYN. Sphærogyne ferruginea*.

**T. guianensis** (Guiana). *fl.* shortly pedicellate or sessile; calyx limb entire; petals whitish-pink, obovate-cordate, inequilateral; panicle terminal. August and September. *l.* very variable in size and shape; broadly elliptic or ovate, shortly acuminate, rounded at base, very slightly denticulated; petioles scarcely  $\frac{1}{2}$  in. long beneath the bladder. *h.* 3ft. to 4ft. Guiana, 1826.

**T. imperialis** (imperial). *l.* large, elliptic, of a rich dark green, having a silky or velvety surface, and with the principal veins

**Tococa**—continued.

reddish at the base. Peru, 1869. A very handsome plant. *SYN. Sphærogyne imperialis*.

**T. latifolia** (broad-leaved). *fl.* very shortly pedicellate; petals of a beautiful pink or red; panicle terminal, more or less contracted, the branches slender. *l.* long-petiolate, broadly ovate, apiculate, entire or inconspicuously dentate-ciliated below the apex, rounded at base. Stem simple. Equinoctial America, 1862. *SYN. Sphærogyne latifolia*.

**TOCOYENA** (said to be the name of this plant in Guiana). *SYN. Uricaria*. *ORD. Rubiaceæ*. A genus comprising about eight species of erect, glabrous or tomentose, stove shrubs, natives of Brazil and Guiana. Flowers white or yellow, showy, cymose, sub-sessile; calyx five-toothed, persistent; corolla funnel-shaped, the tube slender, the throat naked; limb of five spreading, obtuse, contorted lobes; stamens five, inserted in the throat of the corolla; peduncles short and thick. Berry oblong, many-seeded. Leaves opposite or nearly so, shortly petiolate, ovate or lanceolate; stipules small, acute. *T. longiflora*, the only species known to cultivation, thrives in fibry peat, with the addition of a little lumpy loam, sand, and charcoal. It may be multiplied by cuttings of half-ripened shoots, inserted in sand, under a glass, in heat, during May.

**T. longiflora** (long-flowered). *fl.* sub-sessile, aggregated; calyx tube turbinate; corolla 8 in. to 9 in. long, the tube yellow, the limb white. *l.* lanceolate-oblong, acuminate at both ends, glabrous, 1 ft. long,  $\frac{1}{2}$  in. to 5 in. broad; stipules triangular. Stem tetragonal, very simple. *h.* 6ft. Guiana, 1826. (A. G. 50.)

**TODAROA** (commemorative name). *Campylocentron* is now the correct name. *ORD. Orchideæ*. A genus comprising about fifteen species of stove, epiphytal Orchids, natives of tropical America. Flowers minute, spicate, often distichous; sepals and petals free, narrow; lip sessile at the base of the column, produced in a spur at base; column very short. Leaves distichous, often scattered, oblong, linear, or terete. Stem occasionally leafless, not pseudo-bulbous. Only one species calls for description here. For culture, see *Angræcum*.

**T. micranthum** (small-flowered). *fl.* white; sepals and petals spreading at apex; lip conformed, bilobed; spur obtuse, incurved; spike secund, many-flowered, horizontal, shorter than the leaves. February. *l.*  $\frac{1}{2}$  in. long, oblong, three-nerved, oblique at apex. Stem short. 1836. (B. R. 1772, under name of *Angræcum micranthum*.)

**TODDALIA** (*Kaka Toddali* is the Malabar name of *T. aculeata*). Including *Scopolia* (of Smith), *Vepris*. *ORD. Rutaceæ*. A small genus (six to eight species) of unarmed or prickly, climbing or sarmentose, stove shrubs, dispersed over the tropics of the Old World and the Cape. Flowers in axillary or terminal cymes or panicles; calyx short, two to five-toothed, lobed, or parted; petals two to five, imbricated or valvate; torus inconspicuous or slightly elongated. Leaves alternate, trifoliate; leaflets sessile, lanceolate, coriaceous, entire or crenate, pellucid-dotted. Three species have been introduced, all natives of Mauritius. They are interesting shrubs, thriving in a compost of loam, peat, and sand. Propagated readily by cuttings, inserted in sand, under a glass, in heat.

**T. aculeata** (prickly). Lopez Root. *fl.* white; panicles shorter than the leaves, pilose, many-flowered. May. *l.* leaflets oblong-lanceolate-oblong, acute,  $\frac{1}{2}$  in. to 1 in. broad, entire or obscurely crenate, the edges wrinkled; petioles 1 in. long, flattened upwards. 1790. A climber, often armed with hooked prickles. (B. M. Pl. 49.)

**T. lanceolata** (lance-shaped). *fl.* white, on short pedicels; panicles many-flowered, axillary and terminal, thyrsoid. May. *l.* leaflets oblong-lanceolate,  $\frac{1}{2}$  in. to 3 in. long, acute, entire, the edges wavy; petioles 1 in. to 2 in. long, not flattened. *h.* 4ft. and upwards. 1824. An erect shrub. *SYN. Vepris lanceolata*.

**T. paniculata** (panicled). *fl.* greenish-white, in copious, deltoid, terminal panicles, with spreading or ascending branches. May. *l.* leaflets obovate-oblong, obtuse or sub-acute, 1 in. to  $\frac{1}{2}$  in. broad, bright green; petioles 1 in. to  $\frac{1}{2}$  in. long, sub-terete. *h.* 20ft. to 30ft. 1824. An erect, unarmed shrub.

**TODDY PALM**. A common name for *Caryota urens* (which see).

**TODEA** (named in honour of Henry Julius Tode, of Mecklenburg, 1733-1797, an experienced mycologist). Crape Fern. Including *Leptopteris* (of Presl). ORD. *Filices*. A genus comprising about five species of greenhouse Ferns, almost confined to the South temperate zone, having the capsules of *Osmunda*, but the ordinary habit of *Polypodium*. Sori on the back of the leafy part of the frond. Todeas thrive in the cool house, and prove very ornamental if planted in moist, sheltered places in the open fernery. If rapid growth be desired, the plants should be grown in the tropical fernery, in a close case. The best soil is one composed of fibrous peat and silver sand. Ample shade must be afforded, and the fronds frequently moistened by sprinklings of water. See also **Ferns**.

**T. afriicana** (African). A synonym of *T. barbara*.



FIG. 43. PORTION OF FROND, WITH BARREN AND FERTILE PINNÆ, OF *TODEA BARBARA*.

**T. barbara** (Barbary).\* *cau.* sub-arborescent. *sti.* 1ft. or more long, stout, erect, quadrangular, quite naked. *fronds* 3ft. to 4ft. long, often 1ft. broad; pinnae close, erecto-patent, 1in. to 1½in. long, ½in. to ¾in. broad, the edge more or less distinctly toothed, the upper ones connected at the base. *sori* dense, when mature filling up the whole under surface of the pinnules on which they are placed. Australia and New Zealand, 1869. See Fig. 43. (B. M. 5954.) SYN. *T. africana*, *T. rivularis*.

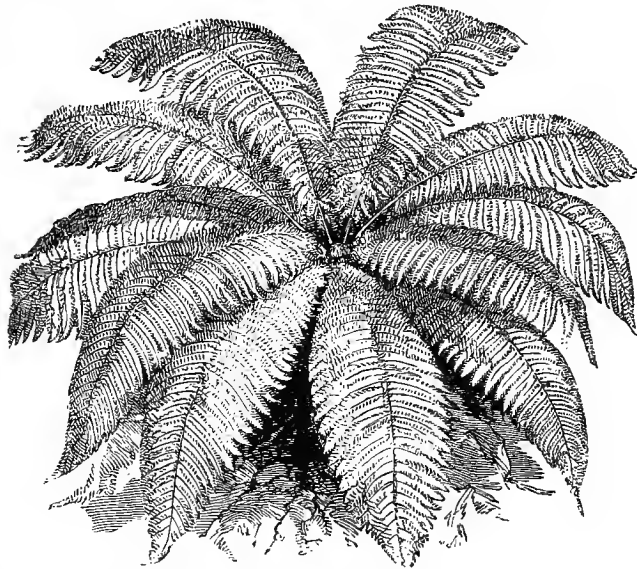


FIG. 45. *TODEA SUPERBA*.

oblong, ½in. to ¾in. long, ¾in. broad, cut down nearly to the rachis into erecto-patent, simple or forked, linear segments; rachises naked or slightly tomentose. New Zealand. See Fig. 44. (H. G. F. 54.) SYN. *T. pellucida*.



FIG. 44. *TODEA HYMENOPHYLLOIDES*, showing Habit and detached Pinna.

**T. Fraseri** (Fraser's). *cau.* erect, woody, 1½ft. to 2ft. high, 1½in. to 2in. thick. *sti.* 6in. to 9in. long, firm, erect, naked. *fronds* 1ft. to 2ft. long, 8in. to 12in. broad, bipinnate; pinnae close, lanceolate, 4in. to 6in. long, ¾in. to 1in. broad, with a narrowly-winged rachis, the lowest about equal to the others; pinnules linear-oblong, ½in. long, ½in. to ¾in. broad, sharply toothed, the rachises naked. Australia, 1861. SYN. *Leptopteris Fraseri*.

**T. F. Wilkesiana** (Wilkes'). *fronds* larger than in the type; lower pinnae rather shorter than the others, and deflexed; rachises slightly pilose. Fiji and New Hebrides, 1870.

**T. hymenophylloides** (Hymenophyllum-like).\* *sti.* tufted, 6in. to 12in. long, firm, erect, naked. *fronds* 1ft. to 2ft. long, 8in. to

**T. h. compacta** (compact). A variety far closer and denser in form than the type.

**T. pellucida** (pellucid). A synonym of *T. hymenophylloides*.

**T. rivularis** (brook-loving). A synonym of *T. barbara*.

**T. superba** (superb).\* *cau.* erect, woody, 1ft. to 1½ft. high. *sti.* 2in. to 3in. long, firm, erect, naked. *fronds* 2ft. to 4ft. long, 6in. to 10in. broad, tripinnatifid; pinnae close, narrow-lanceolate, the central ones 4in. to 5in. long, ¾in. broad, the lower ones gradually reduced; pinnules close, linear-oblong, ½in. to ¾in. long, cut down nearly to the rachis into erecto-patent, simple or forked, linear segments; rachises densely tomentose. New Zealand, 1861. A splendid plant for exhibition purposes. See Fig. 45.

**TOFIELDIA** (named in honour of Tofield, a Yorkshire botanist). False Asphodel. *SYNS. Hebelia, Heritiera*. *ORD. Liliaceæ*. A genus comprising about fourteen species of mostly hardy, perennial herbs; two are natives of the Andes, and the rest are broadly dispersed over mountainous and temperate regions. Flowers small, shortly pedicellate or sub-sessile, in terminal spikes; perianth persistent, the segments distinct or very shortly connate near the base; stamens six. Leaves radical or clustered at the base of the stem, short-linear, sub-distichous; cauline ones few or none. *T. pubustris* is a native of Britain, but of no particular beauty. *T. pubens*, the only species calling for mention here, thrives in any light soil, in a moist situation. It may be increased by division of the roots.

**T. pubens** (downy). *fl.*, perianth whitish, two lines long, raceme loose, 2in. to 4in. long. *July*. *l.* radical, narrow-linear, somewhat rigid, glabrous, 6in. to 12in. long. Stem slender, 1ft. to 2ft. high. North America, 1840. (B. M. 3859.)

**TOLMIEA** (dedicated by Torrey and Gray to Mr. Tolmie, surgeon of the Hudson's Bay Company at Puget Sound). *ORD. Saxifragææ*. A monotypic genus. The species is a hardy herb, with a perennial rhizome. It was formerly included under *Tiarella* (which see for culture).

**T. Menziesii** (Menzies'). *fl.* greenish, rather large, nodding, in a slender, elongated raceme; calyx purple-nerved; petals five, capillary. *April*. *l.*, radical ones petiolate, alternate, incised-lobed; cauline ones alternate. Stem 1ft. to 2ft. high, three to five-leaved, hairy. North-west America, 1812. *SYNS. Heuchera Menziesii, Tiarella Menziesii* (H. F. B. A. i. 80).

**TOLPIS** (a name given by Adanson, probably without meaning, as was his custom). *ORD. Compositæ*. A genus comprising less than eighteen species of pretty, hardy, annual or perennial herbs, rarely with a slightly woody caudex, natives of the Mediterranean region and the Canary Islands. Flower-heads pale or bright yellow, homogamous; ray florets truncate five-toothed at apex; involucre campanulate; bracts narrow, the lower ones one or two-seriate, the upper ones in many series; receptacle naked or honeycomb-like. Leaves mostly radical, or alternate on the lower part of the stem, entire, toothed, or pinnatifid, the upper ones often narrow. The following species, which are those best known to cultivation, are well suited for the ornamentation of flower borders, where the seed may be sown in spring. All flower in June.

**T. altissima** (very tall). A synonym of *T. virgata*.

**T. barbata** (bearded). Yellow Garden Hawk Weed. *fl.*-heads, involucre slightly farinose, the outer scales subulate-falcate. *l.* lanceolate, toothed. Stems erect, branched, leafy. South Europe, &c. *SYN. Crepis barbata* (B. M. 35).

**T. macrorrhiza** (large-rhizomed). *fl.*-heads nearly as large as those of *T. barbata*, disposed in an ample panicle; involucre farinose-pubescent; pappus of fifteen to twenty bristles; pedicels squamulose. *l.* undivided, oblong, toothed, sessile, slightly fleshy-coriaceous. Stems shrubby, branched; root thick, fleshy. Madeira. Plant highly glabrous. *SYN. Crepis macrorrhiza* (B. M. 2988).

**T. umbellata** (umbel-flowered). *fl.*-heads pale yellow, one-half smaller than those of *T. barbata*; peduncles tomentose at apex. *l.* oblong-linear, toothed; upper ones entire. Stems erect, branched, nearly naked. *h.* 2ft. South Europe, 1820.

**T. virgata** (twiggy). *fl.*-heads small; pappus of six to ten bristles; involucre and pedicels farinose-pubescent. *l.* elongated, linear-lanceolate, toothed; upper ones linear, entire. Stem erect, branched, glabrous. *h.* 3ft. South Europe, &c., 1823. *SYN. T. altissima*.

**T. v. grandiflora** (large-flowered). *fl.*-heads citron-colour; involucre mealy, the outer scales short and subulate. *l.* radical, lanceolate, toothed, sparsely hairy, densely villous towards the base. South Italy, Sicily, &c., 1830.

**TOLU BALSAM-TREE.** See *Myroxylon Toluiferum*.

**TOLUIFERA.** A synonym of *Myroxylon* (which see).

**TOMATO** (*Lycopersicon esculentum*). A tender annual, native of South America, cultivated for the use of its fruit for cooking as a vegetable, as an ingredient

**Tomato—continued.**

in salads, for making Tomato sauce, and for various other culinary purposes. The fruits are sometimes used in a green, but more generally in a ripe, state. In most gardens of extent, the Tomato is considered one of the most important vegetables grown, and the keeping of a continued supply, if possible, throughout the whole year, is a point to be specially aimed at. For marketing, Tomatoes are very extensively cultivated, as they invariably command a good price, except, perhaps, for a limited period when the general crop is being harvested at the end of summer. The annual supply grown in this country for market purposes is nothing like equal to the demand, and large quantities of fruits are imported. Of late years, a considerable number of establishments have sprung into existence in which Tomatoes are cultivated (planted out) under glass on a vast scale; and while the demand for their produce is good, and more likely to increase than diminish, it proves, as a rule, a remunerative undertaking, and one which promises to continue so. In this country, it is only in warm situations, and in favourable localities, that the Tomato crop can be depended upon in the open air, though much depends on the season — whether it be a hot and dry, or a cold and wet one — and the strength of the plants when placed outside. Plants raised under glass, and grown to a good size, large enough to begin flowering, or even setting fruit, before being put out into their permanent quarters, have a manifest advantage over others which are not so prepared, in perfecting a crop afterwards. Indoors, Tomatoes may be grown to bear freely in large pots or boxes, or they may be planted in a ridge of soil, and trained to a trellis, or nailed against the back wall of a melon or cucumber house, provided there is sufficient light.

Tomatoes may be increased in any quantity from seeds, which ripen in abundance in most of the fruits that reach maturity; or they may be raised from cuttings, which is sometimes an advantage, as these root readily in heat, and soon grow to a fruiting size. Seeds intended for raising plants for the open air should be sown at the end of February, or during March, in 5in. pots, or in shallow pans, filled with light soil, and placed in a temperature of 55deg. or 60deg., either in a heated structure, or on a hotbed. As the seedlings come up, they must be kept well exposed to light, to prevent them becoming drawn. When the second leaves appear, they should be potted off singly, and still kept in heat, until re-established, when they may be grown on in any light house or frame, with more air, until gradually they are hardened off for placing outside, towards the end of May, or early in June. If placed singly, at first, in 3in. pots, the plants may be readily shifted into others, 6in. in diameter, some time during April, and this will be sufficiently large for them. Some growers place two plants in a pot, opposite each other, and close to the edge, and then divide the ball when planting out; but it is obvious that this must injure the roots, although, if they are not very much crowded, and due attention is given to watering and, if necessary, shading, for a few days, new growth is soon commenced. As our ordinary summers are not long-lasting, it is most important that the plants be thus forwarded, and special attention given them in training, to induce a fruitful, instead of a too luxuriant, growth. This may best be done by keeping the side shoots pinched out, and limiting each plant to the centre one only, or, at most, to not more than two. Treated in this way, the clusters of flowers which will appear before the plants get up very much will be strong, and — what is of equal or more importance — they will be swelling off at the earliest possible moment. Early ripening, or management with a view to attaining it, is quite a necessity, as it is of little use only having heavy crops at a time when they cannot ripen for want

**Tomato**—*continued*.

of sun. The best place for Tomatoes outside is a warm south wall; there are generally spaces in such positions, unoccupied by fruit-trees, which cannot be more profitably furnished. Select the places, and add a few spits of turfy soil round each plant when inserting it. The after-treatment consists in keeping the leading shoots tacked up as they lengthen, and in pinching off all the side ones rather frequently—say, once a fortnight—if there are any formed. In dry weather, water should be plentifully given if the plants appear to be in want; but a mulching of loose, leafy manure or litter will, if applied, be of material advantage in preventing this. Fruits, when they commence colouring, should be fully exposed to the sun; this can be done by fastening to one side, shortening, or removing altogether, some of the leaves which prevent the direct exposure to sunlight. When there is danger of frost, any green fruits may be cut and placed on a shelf in a warm house or vinery—if it is kept rather dry, so much the better—where many of the most forward ones will ripen. The plants, and also any part of the crop that is left out, are soon destroyed by frost.

Tomato culture outside, in market gardens, has of necessity to be conducted on a different system, as there are no south walls as in private gardens. The plants are raised in frames, filled with fermenting manure, in early spring, and grown on as sturdy as possible, by allowing them plenty of air on all favourable occasions. Towards the end of May, they are thoroughly hardened off by removing the sashes daily; afterwards, they are planted in one of the most favourable warm positions at command, and still protected until all danger from frost is past. Large Red and Conqueror are two of the most profitable varieties for outside culture, either in private or other establishments: they fruit freely, and the produce is large and ripens well, provided the conditions under which the plants are placed are such as suit Tomatoes outside.

When grown in the open ground, the plants may be trained to strong stakes about 4ft. high, and the side shoots kept well thinned, to allow all the strength to pass into the fruits situated on the main. Where there is lack of wall space, this method of planting may be adopted in any garden; the plants must be strong and well hardened off before putting them out, and the position given them should be well sheltered and one of the warmest at command: a south border is most desirable.

Under glass, and with sufficient heat and space at command, Tomatoes may be had in greater or less quantity all the year round. During summer, when the supply is but uncertain from outside plants, it is always advisable to have some additional plants fruiting indoors, and from these the produce is also superior, because better ripened. The plants may be grown in large pots or deep boxes, or they may be planted out in a narrow bed formed with loose bricks to allow an inside space of about 2ft. Plenty of light is essential; consequently, a span-roofed house is best adapted, although a lean-to answers admirably. Plants raised from cuttings are generally preferred, as they are considered to begin bearing earlier, and are sometimes less vigorous than seedlings, which is an advantage in a limited space; but either plan of propagating may be adopted. Cuttings root very readily, if kept close, anywhere in heat, and either spring or the latter part of summer is the best time for renewing the stock. Young plants bear best, and, as they can be so easily raised, it is preferable to replace old ones rather than keep them after the produce begins deteriorating in size and quality. Ripe Tomatoes are most valued if procurable during the winter and in early spring; the plants intended for bearing at these seasons are, therefore, of much importance. Cuttings, struck in August, in small, single pots, should be

**Tomato**—*continued*.

grown on and shifted into larger ones as becomes necessary, until a 10in. or 12in. size is reached, which will be sufficiently large for fruiting them in if pot culture is adopted. Even when it is intended to plant in narrow borders or in boxes for fruiting, the plants may first be grown in pots and transferred to their permanent quarters when some of the earlier fruits are set. The mode of training should be that of keeping either to a single stem, or to two main shoots, all side ones being kept removed from the first. These shoots should be supported, from an early stage, with a stake; and a wire trellis, fixed about 9in. or 12in. from the glass, is best to train to afterwards. To get two shoots formed of about equal strength, the plants should be pinched once when from 6in. to 9in. high; and to encourage the production of heavy crops, the extreme points may be taken out after each bunch of fruits shows: new leaders will form readily, and generally additional fruits will appear at their first joints; hence the productiveness at an early stage, and in a small space, secured by this mode of training. This frequent stopping is not a necessity where there is plenty of space for the plant to grow: it will invariably show far more flowers than can be perfected, if the variety is a productive one. When sufficient are set for a crop, the others which appear may be pinched off. To succeed autumn-raised plants, others should be propagated in February, and grown on in pots preparatory to being placed in permanent positions. A night temperature in winter of 55deg. to 60deg., with a rise of 5deg. by day, is not too high for Tomatoes. They need a somewhat similar temperature to winter Cucumbers, with which they are sometimes grown in the same house. If but an occasional dish of ripe fruits can be secured in winter, they are generally much valued; through the dull season the ripening process goes on but slowly. Throughout the summer, Tomatoes may be grown in almost any glass structure, or in slightly-heated pits and frames, after the latter are cleared of bedding plants, &c., for the season; and the crops thereby obtained are more certain to ripen than those on plants outside, although in private gardens, where a quantity is required, both modes of culture are recommended.

Tomatoes need an ample supply of water at all times, particularly when growing in pots or in any limited space. A rough, turfy compost, with a little decayed manure intermixed, will suit them; it is preferable to give manure water, or one of the concentrated artificial manures, when the fruits begin swelling, than to give a very rich compost previously, which would tend to induce too vigorous a growth—perhaps at the expense of productiveness.

*Fungi.* Tomatoes frequently suffer greatly from the attacks of the Potato-disease Fungus. See **Phytophthora** for an account of this parasite, and of the means to be employed against it.

*Insects.* Tomato-plants are seldom very seriously injured by insects; but in the course of the year 1886 a species of *Aleyrodes* (see **Snowy Fly**) proved very destructive, in several localities, to plants in green-houses, and more especially to Tomato and Cucumber-plants. The species now in question was named *A. vaporariorum*, and figured, by Prof. Westwood, in 1856. The larvæ feed on the backs of the leaves, piercing the skin and sucking the juices, like the more common *A. proletella* on Cabbages. The pupæ are also fixed to the leaves; and the perfect insects emerge after a few days spent in the pupal stage. The insects differ from *A. proletella* in having milk-white, unspotted wings and pale yellow bodies. The leaves occupied by them turn yellow, wither, and die. These insects are unable to withstand exposure to the open-air temperature of England; and are supposed to have been brought from Central America or Mexico, with plants of some sort.

**Tomato**—*continued*.

They have been found on the Continent of Europe, on a large variety of trees and shrubs.

**Remedies.** The remedies employed should be the same as those found to give good results against **Aphides** (which *see*), which these insects greatly resemble in their habits.

**Sorts.** Of the somewhat numerous sorts of Tomatoes in cultivation, the subjoined is a selection. For general purposes it is immaterial whether the fruits are smooth,



FIG. 46. RIBBED FRUITS OF TOMATO.

or ribbed, as represented in Fig. 46; but there are many occasions when those of even outline and medium size are especially asked for. It is, therefore, advisable to grow at least one of the smooth kinds.

**Aome.** Fruit purplish-crimson, handsome, smooth in outline, very distinct in colour. Plant prolific.

**Chiswick Red.** Fruit bright scarlet, egg-shaped, borne in large clusters. Exceedingly productive, and of good quality.

**Conqueror.** Fruit vermilion-red, large, handsome, of excellent quality. Early, and one of the best for outdoor culture.

**Dedham Favourite.** Fruit rich ruby-red, of large size, quite smooth. Productive, and good for exhibition.

**Greengage.** Fruit of a beautiful citron-yellow colour, when ripe, produced in clusters. The best yellow-fruited variety; very distinct and ornamental.

**Hackwood Park Prolific.** Fruit scarlet, large, smooth, even in form and size, borne in large clusters. Early, and exceedingly productive.

**Hathaway's Excelsior.** Fruit fine red, handsome, very smooth and even in outline, firm, and of excellent quality. One of the best.

**Large Red.** Fruit deep scarlet, very large, flattened and ribbed. Very productive, and well adapted for outside culture.

**Orangefield Dwarf.** Fruit red, large, frequently much ribbed, of excellent flavour. Plant unusually dwarf, early, and an abundant bearer; one of the best for indoor culture in a limited space and during winter.

**Pear-shaped.** Fruit red, pear-shaped, very distinct, produced freely in clusters. This variety is ornamental, but not very extensively cultivated.

**Stamfordian.** Fruit red, smooth, very large, somewhat in the way of *Trophy*. Fine for exhibition.

**Trophy.** Fruit red, exceedingly large and nearly smooth. Productive, but rather late.

**CHERRY AND RED CURRANT TOMATOES.** These are chiefly grown for ornament, as their fruits are borne in great profusion in bunches or clusters. They represent, in general appearance, the Cherry and Red Currant, after which they are popularly called.

**TOMATO, CANNIBAL'S.** *See Solanum anthropogorum.*

**TOMENTOSE.** Covered with tomentum.

**TOMENTUM.** Dense, rather short, rigid hairs, which are sensibly perceptible to the touch.

**TOMEX.** Included under *Litsea*.

**TOMICIDÆ.** A name occasionally employed for the family of Beetles now called *Scolytidæ* (which *see*). The name is taken from *Tomicus*, one of the chief genera in the family.

**TONGA-PLANT.** *See Epipremnum mirabile.*

**TONGUE-GRAFTING.** Another name applied to Grafting by the whip or splice method—that most generally practised in this country, and with the greatest success when stock and scion are both small and of about an equal size. When preparing the two surfaces that are to fit

**Tongue-Grafting**—*continued*.

together, a small, thin tongue is cut in an upward direction in the scion, and also a notch the opposite way in the stock, corresponding in size as near as can be judged. In fitting the two together, the notch may be kept open with a knife, and the tongue should be carefully inserted. It acts as a great support to the scion, and materially aids in keeping the latter in position while the bandage is put on, and until the parts unite. By cutting a tongue in this way, and fitting it properly, there are also additional surfaces that may grow together and render the union still more complete. *See also Grafting.*

**TONGUE GRASS.** A common name for *Lepidium sativum* (which *see*).

**TONIC.** Bracing; corroborative.

**TONNINGIA.** A synonym of *Cyanotis* (which *see*).

**TONQUIN BEAN.** *See Dipterix odorata.*

**TONSELLA.** Included under *Salacia*.

**TONTANEA.** A synonym of *Coccocypselum* (which *see*).

**TONTELEA.** Included under *Salacia*.

**TOOLS, IMPLEMENTS, &c.** For gardening purposes, it is customary to provide Tools of all descriptions used in carrying out all kinds of work. On their description and quality depend materially the amount of work that may be accomplished, and also the manner in which it is done; workmen generally do more with good and useful Tools that are always kept clean, than if they had to use others, indifferent in quality and make, or rusted because of being subjected to wet weather or taken in dirty, and neglected while temporarily stored away. This latter is, unfortunately, a too frequent occurrence, sometimes arising from disinterestedness on the part of workmen: the defect might be cured by the adoption of a simple rule by those in charge, which should be applicable to all who use anything from the Tool-shed. Some of the Tools used in gardens are requisite in all establishments, whether conducted on a large or small scale, as, for instance, the spade; this is indispensable at all seasons. It may, therefore, be taken as an example in referring to the importance of having Tools of good quality, even if at a little more expense at first. Inferior articles are most unprofitable, no matter of what description. Tools also need proper usage and to be kept clean. The first of these remarks is commended to the attention and judgment of persons who have to buy or procure Tools; the second to those whose lot it is to subject them to daily or occasional use.

In the subjoined general notes on Tools, Implements, &c., reference is made to requisites which should be found in establishments where gardening work of the ordinary routine is carried out. The extent of a place, and the number of workmen employed, must necessarily be the guide for quantity: no general scheme is applicable. It might seem unnecessary to make reference to what is apparently so familiar in relation to Tools in daily use; but those best known are the most essential, and must therefore be noticed, while many others which are only occasionally required, are none the less requisite, and should therefore be ready at hand.

**Averruncator.** One of these is most useful in gardens where there are extensive grounds attached, with tall-growing shrubs, standard trees, &c., that need pruning at a considerable height above ground, and yet cannot conveniently be reached by means of a ladder or steps. The Averruncator consists of a hooked blade, which is fixed into the end of a handle, made ready for use in one length, or sometimes in two, with provision for joining them together when requisite. To the fixed hooked blade, another blade with a semicircular cutting

**Tools, Implements, &c.—continued.**

edge is attached, generally riveted; this has a lever, with a cord tied to the end, so that, when the cord is pulled from below, the two blades close, and sever branches—if the wood is not too hard—of nearly, or quite, lin. in diameter. A spring, which is fastened to the fixed, and also to the lever, blades, separates their cutting edges so soon as the rope is loosened. For pruning or cutting into shape tall trees and shrubs at considerable elevations, this is the most effectual plan, as a workman may stand on the ground, and easily detach branches situated at a height of from 12ft. to 16ft., provided, of course, that the handle is sufficiently long. The cord passes from the lever over a small pulley fixed to the handle, and thus full purchase is secured.

*Axe.* A small, short-handled Axe is adapted for cleaving blocks of firewood, after they have been sawn into proper lengths; it may also be used for sharpening large stakes, and for many other purposes. It is also advisable to have, in addition, one of a larger size, if such work as tree-felling has ever to be executed.

*Bill-hooks.* One or more of these are in frequent requisition for sharpening stakes, chopping firewood, cutting down high hedges, large common shrubs, &c. Bill-hooks are made with or without a chopper at the back. They are familiar to everyone, and are in constant use.

*Brooms.* For outdoor work, sweeping lawns, walks, &c., birch Brooms are most generally used, and are best adapted. In some gardens, these are made in wet weather by the workmen, but Brooms ready for use may be procured in any quantity when this is inconvenient or impracticable. In either case, the wood or a stock of Brooms should be procured in winter before the sap rises; when deferred until this takes place, the twigs are much less tough, and do not last. Brooms, or reserve wood for making them, may best be kept in an open or airy shed, preferably on the cross-beams, where it is dry. For cleaning the floors of glass structures, the ordinary long-handled Brooms generally used in houses are best.

*Chisels.* In pruning operations, when the pieces to be detached are inconveniently situated for cutting, either with a knife or pruning-saw, Chisels are sometimes used. For this purpose, those employed in gardens are somewhat similar in shape to those used by carpenters. Chisels are occasionally employed for pruning at considerable elevations; they are attached to handles of various lengths. When grafting large tree stocks, by the cleft method, a chisel shaped somewhat like a sharp wedge is employed; this is called a Grafting Chisel. Besides these, a strong, wrenching Chisel is always valuable in a garden, for opening cases, &c., which usually arrive, more or less frequently, by rail.

*Crowbars.* One of these, at least, is recommended to be kept for making holes wherein to insert strong stakes, or any which cannot conveniently be driven into the solid ground. A round bar of iron, with one end tapered to a point, and the other made wedge-shaped, is most generally employed: the wedge end is sometimes valuable for levering or lifting plants in large tubs and other things which are unusually heavy.



FIG. 47. DAISY GRUBBER.

*Daisy Grubbers and Daisy Rakes.* For removing Daisies from lawns these tools are employed. The Grubber is an implement about 18in. long, with a handle at one end and a claw at the other (see Fig. 47), for digging up Daisies by

**Tools, Implements, &c.—continued.**

the roots. Daisy Rakes have broad teeth with sharp edges (see Fig. 48) that cut off Daisy flowers from lawns, but of



FIG. 48. DAISY RAKE.

course do not destroy the roots. The latter may be used for raking short lawn grass instead of sweeping it with a broom.

*Dibbers.* These may be made from pieces of ordinary wood, shaped like a right angle, or somewhat like an obtuse



FIG. 49. DIBBER.

angle, and pointed, or from old spade handles; the latter are generally favoured (see Fig. 49). To make them last a long time, the points are sometimes cased with steel, but there is no real necessity for this. Dibbers are of most use where the soil is rather light; in heavy lands, the holes made by them are often smooth inside, and the roots of plants do not so readily penetrate. The uses to which Dibbers are put, for inserting plants, &c., are generally well known. The Potato Dibber has a handle long enough for a workman to use standing upright, and is provided with a piece of wood or iron, which is used as a treadle. This, being fixed at the required distance from the end, insures all the Potato sets being put in at a uniform depth below the surface of the soil.

*Edging-iron, or Verge-cutter.* A tool used for cutting-out beds in turf and for trimming the edges of walks in flower-gardens, pleasure-grounds, &c., when these are composed of turf. It consists of a sharp-cutting steel blade formed in the shape of a crescent (see Fig. 50), with a socket attached, into which a round handle is fixed, with a cap on the top like that of a spade. There are other kinds of Verge-cutters, but this is the one generally used, and it answers most effectually. It may be guided to cut edges, outlines of beds, &c., in turf, of almost any desired shape.

*Forks.* Forks of one or more kinds are amongst the most useful implements in gardens: for many purposes,



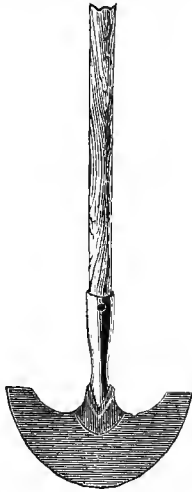
**Tools, Implements, &c.—continued.**

FIG. 50. EDGING-IRON.

there is nothing which could form an efficient substitute. Forks should always be light: they cannot be readily handled and used when constructed so as to appear heavy when lifted. For digging, either a four or five-tined Fork is best: the latter is generally preferable of the two, as the tines or prongs are close together. Most Digging-forks are made with narrow, steel tines, but a useful kind for such work as Potato-digging has broad



FIG. 51. FLAT-TINED DIGGING-FORK.

ones, as represented in Fig. 51. For digging hard ground, a Fork is not a good substitute for the spade, but when the soil is light and also loose at the bottom it may sometimes be substituted with advantage. In transplanting trees of any description, a Digging-fork with narrow tines should always be used for separating soil which surrounds the roots. Dung-forks are invaluable for turning and mixing litter and leaves, or any light manure. The best are those with either three or four small, steel tines, which pass readily through the manure, and seldom clog when in use. Other kinds of Forks are made for special purposes—as, for instance, very large ones, with four or five long prongs, for loading leaves; and others, with long handles and only two prongs (like those used for haymaking, but stronger), for lifting bundles of straw, wood, &c. There are also small Hand Forks, with three flat prongs, which are useful for plunging plants amongst tan or cocoa-nut fibre.

**Grubbing-axe, Pick, and Pickaxe.** Whenever there are trees of more than ordinary size to be rooted out by garden workmen, one or more Grubbing-axes should be included in the list of tools. Common Picks are requisite for breaking up the surface of walks, &c., and one end of the pickaxe may also be used for similar purposes. The difference between these had better be explained: the ordinary or common Pick has both of the ends pointed, and cannot, therefore, be used for cutting roots; a Pickaxe has one end pointed, and the other made like a chopper, its edge being in line with the handle; the Grubbing-axe has both ends wedge-shaped for cutting—one being in line, and the other turned cross-

**Tools, Implements, &c.—continued.**

ways, with the handle (see Fig. 52). The ends of all these require, when in constant use, rather frequent attention by a blacksmith; otherwise, they soon get blunt.



FIG. 52. GRUBBING-AXE.

They should be well steeled and tempered, to make them last as long as possible without being repaired, and to keep the point or edge sharp and in good order.

**Hammer.** The best form of Hammer for gardening purposes is that with rather a short head, having a claw



FIG. 53. GARDEN HAMMER.

at the back (see Fig. 53), for drawing out old nails when training wall trees. This is the principal use for which Hammers are required.

**Hoes.** These are requisite in all gardens for many purposes, the forms most employed being the Swan-necked



FIG. 54. SWAN-NECKED DRAW-HOE.

Draw-hoe (see Fig. 54), and the Dutch or Thrust-hoe (see Fig. 55). The first-named is better than the old form



FIG. 55. DUTCH OR THRUST-HOE.

of Draw-hoe, which soon gets clogged with soil round the eye, particularly if it is the least sticky or wet. Besides hoeing to destroy weeds, this kind of Hoe, which is made in various sizes, is the best for drawing drills for seeds, earthing-up crops, &c. Dutch Hoes, also made in various widths, are sometimes preferred for breaking up the surface of the ground, hoeing flower-beds, and cutting up small weeds in summer. There are two or three other kinds of Hoes which are not altogether requisite: a reference to these may be found under **Hoes and Hoeing**.

**Mallet.** A Mallet is useful for driving stakes into the ground, as, for example, those used for Raspberries and young fruit-trees. It is also required when a chisel is used for cutting off branches, &c., and for various other purposes. A moderately heavy one is best adapted, and it should be made from wood that will not readily split.

**Rakes.** Both iron and wooden Rakes are necessary in gardens, for levelling ground, and for cleaning up refuse of every description. Ordinary wooden ones, such as are

**Tools, Implements, &c.—continued.**

used for haymaking, are best adapted for raking and cleaning large breadths of garden grounds or lawns, and also for levelling gravel. If they are too heavy, the heads may easily be reduced in width and, consequently,



FIG. 56. IRON RAKE.

in weight. Iron Rakes (see Fig. 56) are best for cleaning flower-beds, &c.; it is always advisable to have what is called a set—that is, four or six different ones, varying in width. They should be made light, and not clumsy to handle.

**Rammers.** These are necessary when new walks are being made, or turf relaid; they are also required occasionally for ramming the soil round posts, &c. The handiest form is that with a circular, iron head, with socket attached into which a handle is fixed. Iron Rammers are made in various sizes: those weighing from 7lb. up to 10lb. are handy, and not too heavy to work.

**Reel and Line.** For all garden Lines of considerable length, iron Reels should be provided: the Lines are more readily wound up, and they are always subjected to a circulation of air, which dries and preserves them better

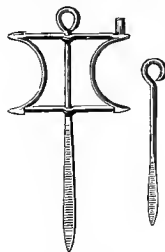


FIG. 57. LINE REEL AND PIN.

than when rolled upon straight, wooden stakes. All Reels should be provided with a small handle projecting above the upper crossbar for turning it to wind up the Line. A strong iron pin accompanies the Reel, for tying the line to at one of the extreme ends, the other end being fastened to the reel before winding (see Fig. 57).

**Rollers.** Where there are walks and lawns, one or more Rollers are needed to keep the surfaces even and firm. They are made in various sizes, and, consequently, of different weights, usually of cast, but sometimes of wrought, iron. Some have the cylinder in two halves, which revolve separately, and allow of turning more readily at the end of a walk, or in another direction to that which has previously been traversed, than if there was only one. When rolling newly-gravelled walks, it is best to have two Rollers—one, a light one, for drawing first, and another, heavy, for rendering the walk firm. All Rollers should be provided with a balance for the handle; otherwise, the weight of this comes on the workman, who should only have to pull. The balance, besides effecting the purpose for which it is intended, also adds to the weight of the Roller.

**Scythes.** For mowing under trees, round shrubs, and on sloping banks and in places where the mowing machine cannot be used, Scythes are requisite; they may also, of course, be used for lawns, but are far inferior to a machine. The ordinary form of Scythe and handle answers very well, although workmen who have been accustomed to cut long grass cannot at first succeed in properly cutting lawns. The two projecting handles should be regulated for, or by, each person who intends

**Tools, Implements, &c.—continued.**

using the Scythe, as it is generally necessary to vary their positions to suit individuals.

**Shears.** Of these there are several kinds, the most necessary being those used for grass-edging, hedge-trimming, and pruning. Grass-edging Shears of the ordinary make, with handles about 3ft. long, are best adapted for general use; the handles should be set on a wider angle than a right angle, taking the cutting blades for the base line. This places the workman, when using the shears, a little behind the blades, and thus enables him to perform his work more effectually. Hedge-trimming Shears have blades nearly equal in length to the handles, 10in. to 12in., and are about 2in. in width; they are used with both

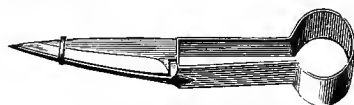


FIG. 58. SMALL HAND SHEARS.

hands. Small Shears (see Fig. 58), for using with one hand, are invaluable for trimming any kind of edgings on a small scale, and for clipping plants which sometimes need it in carpet bedding and other designs. Pruning Shears vary in size according to the dimensions of branches they are intended to cut, from those used easily with one hand, to others, some 3ft. in length (generally called Parrot-hill Shears), that are adapted for severing branches of nearly 2in. in diameter when the wood is not hard.

**Shovels.** These are preferable to spades for shifting or loading loose soil, sand, gravel, &c. The handiest Shovels for gardens are those of medium size, with a square point, and the side edges slightly turned up. The handle should have more bend in it than that of a spade, as this renders shovelling easier. Shield-shaped Shovels are best for shifting stones, and those made entirely of iron are most serviceable for stoking.

**Spade.** The Spade and its value as a garden tool are matters familiar to everyone; it would be impracticable to prepare ground for successional crops without it, as there is nothing which could form an efficient substitute. The two points in a Spade that it is most important should be strong are the back of the part which lifts the soil and the handle just where the first rivet passes through from the capped end. At one of these places Spades will sometimes either bend or break, if they are of inferior make, before they have been used many days. These points should, therefore, be examined by purchasers: it causes great hindrance and loss to have new handles put in—work which is rarely very well done a second time over; and if the back breaks, there is no chance of remedying it. Spades are sometimes broken by improper usage, such as wrenching anything too heavy: this is, of course, a fault on the part of the workmen using them.

**Syringes.** A Syringe is especially required in glass structures for dewing or washing fruit-trees and plants in general at some part of their season of growth. It requires careful handling, and the barrel should not be knocked against any hard surface, which would cause indentations, and prevent the piston from working properly inside. The best Syringes are usually provided with two, or even three, movable roses of different kinds, any one of which may be used according to the force of water required. The kind most generally useful is that with a nozzle in which a ball is placed. When the piston-rod is drawn, the ball allows water to pass in, but it must be expelled through a small tube placed alongside, as the ball fits and closes the nozzle when pressed from behind with water and the piston. By practice, a workman

**Tools, Implements, &c.—continued.**

may spread the water with his finger, and direct its course at will to any position or part of the house. If this cannot be done readily, another perforated rose may be screwed on instead, which will separate the particles of water as they pass through it.

**Trowel.** Garden Trowels are indispensable for lifting and replanting such things as carry a ball of earth with their roots. For bedding-out in May and June, Trowels are in constant demand, and at all seasons use is generally found for them.

**Turfing-iron and Turf-beetle.** The first-named is an implement with a somewhat heart-shaped blade, and a bent



FIG. 59. TURFING-IRON.

handle (see Fig. 59). It is used for lifting turf that has previously been marked out and cut through with an edging-iron. The Turf-beetle consists of a flat piece of wood, about 3in. thick, with a handle attached at an acute

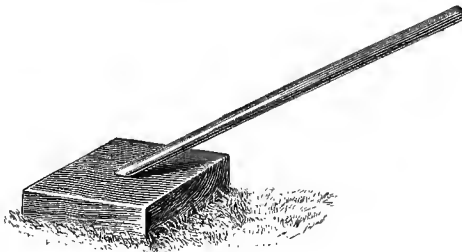


FIG. 60. TURF-BEETLE.

angle (see Fig. 60), to allow of the implement falling flat when lifted and brought down on to the turf. It is used principally for levelling newly-laid turf.

**TOOL-SHED.** A Tool-shed should be found in every garden. It should be provided with pegs, made of either wood or iron, and fixed near the ceiling, for hanging up Dutch hoes, rakes, scythes, and any other tools with long handles. Other pegs may be situated lower down for forks, shovels, spades, &c. A cupboard or chest should contain all small tools and implements, such as hammers, shears, trowels, &c. Every workman should help to keep the Tool-shed tidy, and the tools in good order, by cleaning everything he uses when any work is finished during the daytime, and returning it to its proper place, and also doing the same every evening when the hour for suspending work arrives.

**TOONA.** Included under *Cedrela*.

**TOOTHACHE-TREE.** See *Xanthoxylum fraxineum*.

**TOOTHBRUSH-TREE.** A common name for *Salvadora persica* (which see).

**TOOTHED.** Having any kind of small divisions.

**TOOTHLETED.** Furnished with little teeth.

**TOOTHWORT.** See *Dentaria* and *Plumbago scandens*.

**TOPIARY WORK.** Although the absurd fashion of cutting and torturing trees into all sorts of fantastic shapes has, happily, almost passed away, yet, as the art of the Topiarist was for a considerable period regarded as the perfection of gardening, some mention of it is desirable here. When the fashion first became popular in Britain, it is probably impossible to ascertain; but it reached its highest point in the sixteenth century, and held its ground until driven out of the field, in the last century, by the natural or picturesque style. From an archaeological point of view, it is not to be regretted that examples of Topiary Work on a large scale still exist in several British gardens. Fig. 61 (for which we are indebted to Messrs. Veitch and Sons) represents a view at Elvaston Castle, near Derby. "A large portion of this consists of ornamental hedges of the common Yew, either dividing parts of the grounds from each other, or inclosing spaces devoted to special subjects; and of single specimens, both of the common Yew and its golden variety, cut into conical pyramids of uniform size and height; and of such as these there are upwards of one thousand. There are comparatively few representations of birds and animals; the bolder work represents the walls and bastions of a Norman castle, archways, alcoves, arbours, &c. The great extent of the Topiary Work at Elvaston is calculated to excite surprise rather than admiration; at the same time, its extreme formality is greatly relieved by the noble Conifers of the Fir and Pine tribe which have been planted beside and around it with no sparing hand, and by the beautiful view of the river Derwent, in its winding course through the grounds" (Veitch, "Manual of the Conifera").

Levens Hall, in Westmoreland, is a still more famous Topiarian garden than Elvaston. For an account of this, and an illustration, see vol. xxvi. of the "Archæological Journal." Two illustrations of some of the most remarkable groups in this same garden appeared in the "Gardeners' Chronicle" for 1874, vol. ii., p. 264. Here may be seen figures of the British Lion; of Queen Elizabeth and her ladies; of the Judge's Wig, a number of Yews planted in a half-circle, so as to form an arbour, by bringing the branches over the top in a hood or wig-like fashion; and many others. The astonishing tenacity of life possessed by the Yew is thoroughly proved by the fact that, as the figures (at Levens) above mentioned were first formed early in the eighteenth century, the bulk of the young growths must have been cut off for upwards of one hundred and eighty years, in order to keep the requisite size and form of the objects represented.

**Topiary Work—continued.**

The vast amount of not unskilled labour requisite to maintain in order any elaborate Topiarian designs will, no doubt—apart from any question of taste—prevent a

**Topiary Work—continued.**

and other more or less simple figures, the ordinary principle which now rules the clipping of a Yew hedge was sufficient. The branches were checked where too

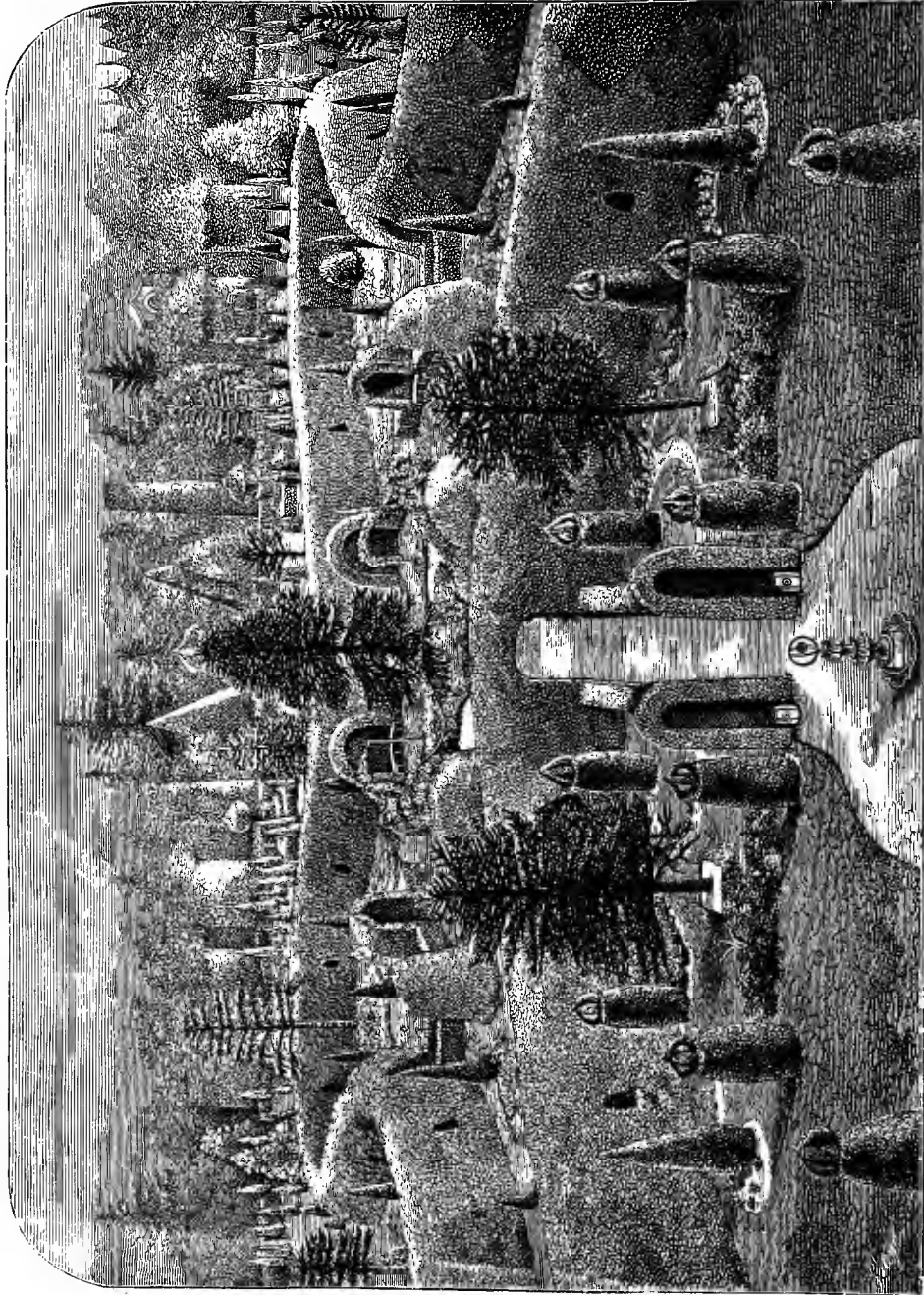


FIG. 61. TOPIARY WORK—THE YEW GARDEN AT ELVASTON CASTLE.  
(From Veitch's "Manual of the Conifere.")

recurrence of such practices to any appreciable extent. Evergreens were almost exclusively used, and of these, the Box, Yew, and Holly were those which lent themselves most readily to the Topiarian's skill. For columns

strong, and allowed to develop when not so vigorous, until the requisite size and shape were obtained, after which repeated clippings were necessary, beginning as soon as the young growths appeared in spring. For

**Topiary Work**—continued.

elaborate figures, a number of plants might be used, and the leading branches of these might be united by "approach-grafting," until a regularly compact network of interlacing branches were securely growing together. By this means, less damage would be likely to occur through heavy falls of snow, or from violent gales. In one of the continental gardens, a few years ago, there were several young plants of the common Ash, grown so as to form, amongst other things, a more or less perfect crown, simply, as the label stated, to show what the skill of the grafter could accomplish. Some half-dozen tall young plants were placed in a circle: one of these was grafted, at some 6ft. from the ground, by approach to the other five, so as to present the appearance of a ring horizontally supported by half-a-dozen stems; from this ring were allowed to develop a series of branches, which were curved over and united into one stem by grafting. After this the branches again divided, and were made to assume other unnatural forms.

Constant attention is required in pruning and dis-budding all such strong-growing plants as the Ash, and distorted and unsightly branches and stems are sure to be the result in a comparatively short time.

**TOP-SHAPED.** Inversely conical, with a contraction towards the point.

**TORCH LILY.** A common name for *Kniphofia* (which see).

**TORCH THISTLE.** An early name given to various species of *Cereus* (which see).

**TORDYLIUM** (the old Greek name used by Dioscorides). Hartwort. ORD. *Umbelliferae*. A genus comprising about a dozen species of hardy, annual herbs, natives of Europe, North Africa, and temperate and Central Asia. Flowers white or purplish, in compound, many-rayed umbels. Leaves undivided or pinnate. The species possess no beauty.

**TORENIA** (name commemorative of Olef Toren, a Swedish clergyman, who discovered *T. asiatica* and other plants in China; he died in 1753.) SYNS. *Nortenia*, *Pentstemon*. ORD. *Scrophularineae*. A genus embracing about sixteen species of stove, glabrous, pubescent, or hairy, perennial herbs (in all probability, annual in a wild state), natives of tropical and Eastern extra-tropical Asia and tropical Africa; one is also found in South America, where it was probably introduced. Calyx tubular, plicate or three to five-winged, obliquely three to five-toothed or bilabiate at apex; corolla tube cylindrical or enlarged above, the upper lip broad, emarginate or bifid, the lower one spreading, of three broad, sub-equal lobes; stamens four, perfect; pedicels ebracteolate; racemes short, few-flowered, fascicle-like, or rarely elongated. Leaves opposite, entire, crenated or serrated. The species known to cultivation are described below. They are of easy culture, and are admirably adapted for hanging baskets as well as for pot culture. The annuals may be raised from seed, sown in March or April, and placed in a warm temperature. When large enough to handle, the seedlings should be pricked off into the pots or baskets in which they are intended to flower. *Torenia*s may also be readily propagated by cuttings: any young shoots will root in a close frame, or under a hand glass in a warm house. A compost of loam and leaf mould, with a little sand or charcoal intermixed, is most suitable. *T. Fournieri*, which grows erect, is best adapted for pot culture: its branches, which do not trail, need the support of a few small stakes. Green Fly are often troublesome to these plants when young. As a preventive, fumigate occasionally.

**T. asiatica** (Asiatic).\* *fl.* on axillary and sub-umbellate pedicels; calyx 1lin. long, scarcely winged; corolla blue, 1lin. to 1½in. long, with very dark violet lateral lobes. June. *l.* shortly petiolate,

**Torenia**—continued.

ovate-cordate or ovate-lanceolate, serrated, 1lin. to 2in. long. Branches 6in. to 10in. long, slender, diffuse. India, &c., 1845. (B. M. 4249; F. d. S. x. 5, xiii. 1342; I. H. 199.)

**T. a. hirsuta** (hairy). *fl.*, lower filaments having a very small tooth. Plant more pubescent than the type. (B. M. 5167, under name of *T. hirsuta*.)

**T. auriculifolia** (Auricle-leaved). *fl.* numerous, growing separately on slender scapes; corolla lobes pale lilac, blotched with purple and veined with white on the disk. Summer. *l.* radical, sessile, ovate. India, 1871. This plant has much the habit of a *Pinguicula*. (F. M. 534.) Its proper name is *Craterostigma pumilum*.

**T. Baillonii** (Baillon's). A synonym of *T. flava*.

**T. concolor** (one-coloured). *fl.* large, on axillary peduncles longer than the leaves; corolla colorous, violet-blue. Summer. *l.* stalked, ovate-cordate, acute, serrate. *h.* 6in. to 12in. China, 1844. A glabrous or sparingly pubescent herb, with diffuse, elongated branches. (B. M. 6797; B. R. 62.)

**T. cordifolia** (cordate-leaved). *fl.* axillary and sub-umbellate; corolla pale blue, ½in. long; pedicels often longer than the leaves. July. *l.* petiolate, ovate, serrated, 1lin. to 1½in. long, cuneate or very rarely cordate at base; petioles rarely as long as the blade. *h.* 4in. to 8in. India, &c., 1811. A sub-erect, sparsely hairy annual. (B. M. 3715.)

**T. edentula** (toothless). A synonym of *T. peduncularis*.

**T. flava** (yellow).\* *fl.* axillary and in distant pairs; corolla yellow, ½in. to ¾in. long, with a purple eye; pedicels usually shorter than the calyx. Summer. *l.* sessile or petiolate, ovate or oblong-ovate, obtuse, entire or crenated. *h.* 6in. to 10in. India, &c., 1878. Erect or decumbent, sparsely hairy or glabrous. (B. M. 6700.) SYN. *T. Baillonii* (B. H. xxix. i., fig. 2; I. H. xxv. 324; R. H. 1879, 15).

**T. Fordii** (Ford's). *fl.* on short, sub-terminal, axillary peduncles; calyx with almost triangular teeth; corolla small, with an exerted tube, the limb straw-coloured with the lateral lobes blotched with violet. Summer. *l.* shortly-stalked, broadly ovate-rotundate or cordate. *h.* 6in. to 12in. An erect, pubescent herb. China. (B. M. 1797.)

**T. Fournieri** (Fournier's).\* *fl.*, calyx ½in. long, broadly five-winged; corolla tube pale violet, yellow at back, 1lin. long; limb 1½in. in diameter, the upper lip pale lilac, obscurely two-lobed, the lower one of three much smaller, bright violet, rounded lobes, the central one with a golden blotch at base; racemes terminal, erect. Summer. *l.* 1½in. to 2in. long, ovate or ovate-cordate, acute, serrated, bright green. Branches crowded, erect from the root, 4in. to 8in. high, much-branched. Cochinchina, 1876. Plant highly glabrous. (B. H. 1879, 1; B. M. 6747; Gn., Dec. 1877; I. H. n. s. 249; R. G. 927; R. H. 1876, 465.)

**T. hirsuta** (hairy). A variety of *T. asiatica*.

**T. peduncularis** (pedunculate-flowered). *fl.* usually pale blue, with yellow spots, midway between those of *T. asiatica* and *T. cordifolia*, but the filaments are not toothed, as in those species. June. *l.* petiolate, ovate, crenate-serrated. *h.* 6in. India, Philippines, &c., 1845. Decumbent or sub-erect, glabrous or softly hairy. SYN. *T. edentula* (B. M. 4229).

**TORFACEOUS.** Growing in bogs or mosses.

**TORINGO CRAB.** See *Fyrus Toringo*.

**TORMENTILLA.** Included under *Potentilla* (which see).

**TORMENTIL-ROOT.** A common name for *Potentilla Tormentilla* (which see).

**TORNELIA.** A synonym of *Monstera* (which see).

**TOROSE.** A cylindrical body, irregularly swollen.

**TORRESIA.** A synonym of *Hierochloë* (which see).

**TORREYA** (named in compliment to Dr. John Torrey, 1796-1873, an American botanist, and one of the authors of the "Flora of North America"). Stinking Yew. SYNS. *Caryotaenus*, *Futataenus*. ORD. *Coniferae*. A genus embracing only four species of hardy, evergreen trees, emitting a strong, disagreeable odour from all parts when bruised, natives of North America, North China, and Japan. Flowers dioecious, the males solitary and sub-sessile in the axils, the female catkins axillary, sessile, one-flowered. Fruit ovoid, drupe-like, ½in. to 1½in. long. Leaves sub-spirally affixed, distichously spreading, very shortly petiolate, linear, flat, similar to those of *Taxus*, but longer. The species do not attain in Great Britain anything near the beautiful aspect they assume in their

**Torreya**—continued.

native countries. *Torreya*s thrive in almost any soil. They are readily propagated from seeds, which should be sown in spring; the ripe fruits, after being gathered, should be mixed with sand, and treated similarly to those of the Hawthorn, until sowing time. Cuttings also afford a ready means of increasing the stock of any species;

**Torreya**—continued.

**T. grandis** (great)\* *fr.* green, the size of a small walnut. *l.* very rigid, linear-lanceolate, rather short, somewhat falcate,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long, light glossy-green above, much paler, with two narrow, greyish lines beneath, on very short, spirally-twisted footstalks, more or less opposite, spiny-pointed. Branches whorled, horizontally spreading; branchlets laterally distichous. *h.* 60ft. to 80ft. China. See Fig. 63. (G. C. n. s., xxii., p. 681; R. H. 1879, 173.) *SYN.* *Cephalotaxus umbraculifera*.

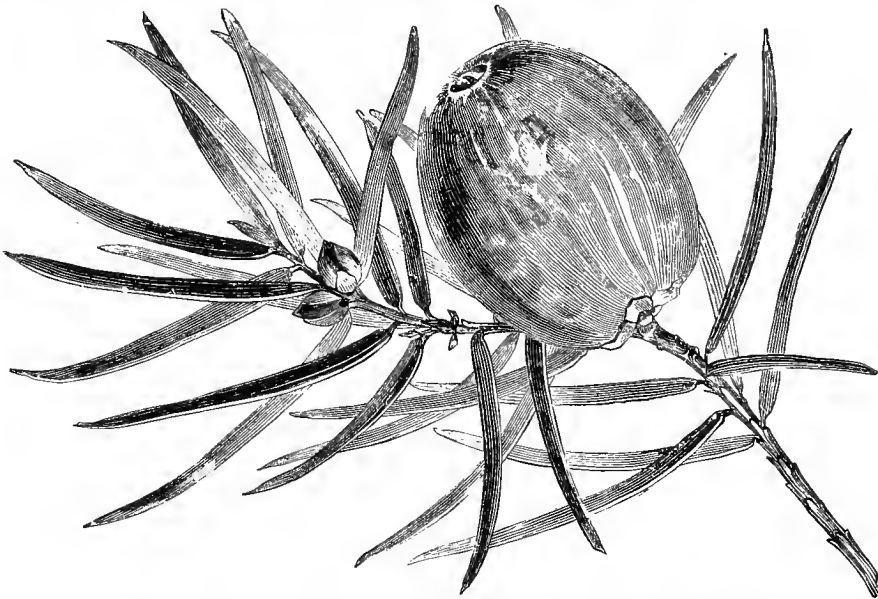


FIG. 62. BRANCH, WITH ONE MATURE AND TWO YOUNG FRUITS, OF *TORREYA CALIFORNICA*.

these should be inserted in sandy soil, in August, and kept shaded under handlights, or in cold frames, during bright sun, until rooted. Layering may also be advantageously resorted to.

**T. californica** (Californian). Californian Nutmeg. *fr.* with a leathery-green covering. *l.* long, narrow, and opposite on the

**T. myristica** (nutmeg-shape-fruited). A synonym of *T. californica*.

**T. nucifera** (nut-bearing). *fr.*  $\frac{3}{4}$  in. long,  $\frac{1}{2}$  in. broad, oval or ovate-oblong, glossy. *l.* linear, rounded at base, quite straight, flat, leathery, spiny-pointed, mostly curved downwards,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long, on very short footstalks, deep glossy-green, glaucous-white beneath. Branches numerous whorled, alternate, or scattered

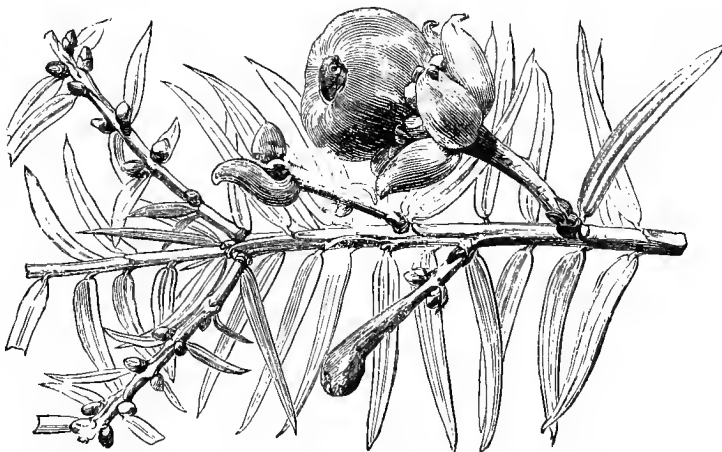


FIG. 63. BRANCH, WITH IMMATURE ABNORMAL FRUITS, OF *TORREYA GRANDIS*.

branchlets, but somewhat alternate and scattered round the principal shoots, linear-lanceolate, spiny-pointed, shortly petiolate, decurrent at base,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long, pale yellowish-green. *h.* 20ft. to 40ft. California, 1851. See Fig. 62. (B. M. 4780; F. d. S. 925; G. C. n. s., xxii., p. 681, under name of *T. myristica*.)

along the stem, horizontally spreading. *h.* 20ft. to 30ft. Japan. See Fig. 64. (R. H. 1873, 315; S. Z. F. J. 129.)

**T. taxifolia** (Yew-leaved)\* Stinking Cedar. *fr.* oval, a little pointed, nearly as large as a walnut. *l.* rounded at base, and somewhat recurved at the extremity, linear, frequently falcate,



**Torreya**—continued.

FIG. 64. BRANCH, WITH MALE FLOWERS, AND DETACHED CLUSTER OF MALE FLOWERS, OF TORREYA NUCIFERA.

stiff, leathery, on very short footstalks, twisted and decurrent at base, spiny-pointed at apex, lin. to 1½ in. long, glossy and convex above, beneath pale glaucous-grey, and marked on each side the

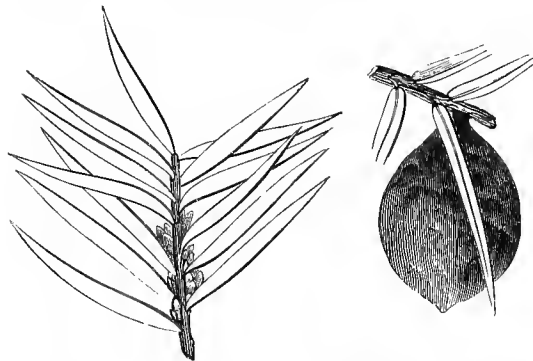


FIG. 65. BRANCHLET AND FRUIT OF TORREYA TAXIFOLIA.

midrib with two narrow, reddish, sunken bands. Branches mostly whorled, spreading; branchlets horizontal. h. 40ft. to 50ft. Florida, 1840. See Fig. 65. (G. C. n. s., iv. 291.)

**TORRUBIA** (named by Leveille, in honour of a Spanish writer on "Vegetable Wasps," as wasps attacked by the plants of this genus [see below] were formerly called). A genus of Fungi, of which by far the larger number are parasitic in insects, spiders, and their allies; while a small number live on other Fungi. *Torrubia* is the name by which the genus is generally known; but it must give place to the name *Cordyceps*, previously conferred by the eminent Swedish mycologist, Elias Fries.

The genus belongs to the group of compound **Pyrenomycetes** (which see); but is peculiar in the substances on which the various species live, and also in the erect, clubbed, fleshy mass of mycelium (called a *stroma*), the appearance of which is shown in Fig. 66. On, or embedded in, it are the flask-shaped perithecia, inclosing the asci. In each of the latter are eight thread-like spores, which usually soon break into joints. These joints are capable of giving origin to the cycle again, if they fall on a suitable stratum, e.g., the body of an insect. But they produce not the Pyrenomycetous fungus, but a smaller vertical stroma, branched or simple, composed of a bundle of mycelium threads, which bear numerous round or elliptical, pale, minute conidia, or spores. This stage of these Fungi was formerly regarded as belonging

**Torrubia**—continued.

to a distinct group (*Hyphomyces*), without asci, and the various forms were grouped together under a new generic name—*Isaria*. This genus resembles *Cordyceps* in having an erect, club-shaped stroma; but, instead of inclosing perithecia with asci, the filaments of the mycelium end in free tips, each of which bears small, oval or globular, pale conidia, capable of reproducing either *Isaria* or *Cordyceps*. For convenience, the genus *Isaria* is still kept up, as the perfect or mature forms of a large number of the Fungi placed in it have not yet been recognised, and to attempt to dispense with the group would, at present, only cause confusion and

FIG. 66. CORDYCEPS SINENSIS, GROWING ON THE LARVA OF A MOTH—*a*, Stroma of the Fungus, divided at the tip into three branches; *b*, the Larva, from which the Fungus has grown out.

uncertainty. Moreover, there is reason to believe that several of the forms referred to *Isaria* do not belong to *Cordyceps*, but should be referred to other genera; inasmuch as they live on a wider range of materials, and some injure living plants also (e.g., *Isaria fuciformis* destroys grasses in Australia and in the South of England), while *Cordyceps* is not known as a parasite on living plants. Most of the species in the latter genus abound in tropical countries; but several have been found in Britain, in all their stages of development, on dead insects. Among the best-known of these are *C. entomorrhiza* and *C. militaris*: these form slender stalks lin. to 2 in. in height, the clubbed heads on which are ovoid or globose. On tracing the stalks downwards, they are found to rise from the bodies of larvæ or pupæ, buried in the soil or among dead leaves. These Fungi may be regarded as beneficial to gardeners, inasmuch as they destroy insects, many of which feed on garden produce. They are not often met with, however, and can

**Torrubia**—continued.

scarcely be regarded as of much importance from this point of view. On the other hand, no species of *Cordyceps* is known to be injurious in gardens. Probably, the species most widely known, by its popular name at least, is the so-called "Vegetable Caterpillar," often sent from New Zealand. This reaches a height of from 6 in. to 8 in., the club being from 3 in. to 4 in. long, and  $\frac{1}{2}$  in. thick. It grows out of the body of some large larva (usually that of an insect allied to the Otter Moth or Ghost Swift), and is often erroneously supposed by the finders to be a caterpillar in course of development into a Fungus. This Fungus is *C. Hugelii*, Corda; though more generally referred to in English works by the name *C. Robertsii*, given to it, by the Rev. M. J. Berkeley, at a later date than Corda's. Mr. Berkeley has described a still larger species from Australia, under the name *Sphaeria Taylori*.

**TORRUBIA** (of Vellozo). A synonym of **Pisonia** (which see).

**TORTOISE-PLANT.** See *Testudinaria elephantipes*.

**TORTRICINA** (from *torqueo*, to twist). A group of Moths, popularly known as Leaf-rollers, because of the habit exhibited by the larvæ of many species of rolling up the leaves of their food-plants into tubes, in which they shelter themselves from birds and other foes. Inside the tubes the larvæ live and feed in safety; but when the food-plant is shaken, each larva drops from its tube, and hangs suspended by a silken thread. When the danger is past, the larva climbs up the thread, and regains the shelter of the tube. Many larvæ become pupæ in the tubes. Some species live in roots or twigs (see **Retinia**), or in unripe fruits (see **Apple or Codlin Grub**). The *Tortricina* are all of small size, scarcely any of the moths reaching 1 in. in spread of wings. The body is slender, but the wings are comparatively broad, and when at rest they slope like the roof of a house above the body. In many, the costa, or front margin, of the wings is peculiarly curved; so that the insect at rest is not unlike a bell in outline when seen from above. The front wings are, in most of the species, rather uniformly coloured; usually being some shade of brown, with darker markings, or bands and spots. Some show metallic spots; and others have the wings variegated with black and white, while others have them some uniform shade of green. The palpi, or feelers attached to the mouth-pieces, are short and inconspicuous. The larvæ have never less than sixteen prolegs, or sucking feet, on the hinder rings of the body.

A good many species of this group are injurious to cultivated plants, often by eating the leaves; e.g., *Tortrix viridana* sometimes strips Oak-trees bare. Roses are also much damaged by several species that live in the rolled leaflets, or inside the leaf-buds and flower-buds. Most fruit-trees are more or less liable to similar injuries; and the *Coniferae* often have the twigs pierced up the centre by the larvæ. Herbaceous plants, though occasionally attacked, are far less often seriously damaged than woody plants or shrubs.

**Remedies.** These vary according to the nature of the injury done. Larvæ in tubes are best got rid of by beating the branches well over sheets, or over vessels tarred inside to prevent the escape of the larvæ. The insects shaken off should be destroyed. Such as live in twigs are more difficult to dislodge; but sickly twigs should be cut off and burned. Fruits tenanted by larvæ usually fall prematurely, and such windfalls should, without delay, be collected from the ground, and destroyed, or given to pigs, as the larvæ very soon bore out of the fruits, and pass into the soil, there to remain all winter as pupæ. Further information is given under **Moths**, **Oak** (**INSECT PESTS**), and **Tortrix**.

**TORTRIX** (from *torqueo*, to twist; in allusion to the leaves of plants being twisted or rolled by the larvæ, to form tubes in which they live). The leading genus of the group of small Moths known as the *Tortricina*. The genera in this group are distinguished from one another by very slight characters, so that it is difficult for any one but a specialist to be sure of the genera and species. *Tortrix* is closely related to several other genera, and its extent is somewhat uncertain; some specialists forming several genera from an assemblage of species that others consider ought to be retained in one genus. In the genus, even when most restricted, there are several species hurtful to garden produce and to cultivated trees. Of these the most destructive is *T. viridana*. This insect has the fore wings pale green, with their front margin sulphur-yellow; they extend from  $\frac{3}{4}$  in. to 1 in. in span. The larvæ live in tubes formed by rolling up leaves of almost all kinds of trees, and of some shrubs; but they are peculiarly destructive to Oaks, which they occasionally strip absolutely bare. *T. iterana* has pale-ochreous wings, and is about the same size as *T. viridana*. Its larvæ feed mostly in rolled leaves of herbs, and may be looked on as almost harmless, as they usually feed on weeds. *T. heparana* and *T. ribeana* are both brown, with darker markings. The larvæ of both feed on the leaves of various trees, and are at times hurtful to fruit-trees. *T. (Ecnetra) Pilleriana*, though very rare in Britain, is, in some seasons, very destructive to Vines in France, and elsewhere on the Continent, stripping off the leaves. The larvæ have been observed passing the winter sheltered under loose bark, emerging in spring to feed on the buds and young leaves. The fore wings of this Moth have a spread of only about  $\frac{3}{4}$  in.; they are pale ochreous, with a brown patch near the base, and a brown cross-bar in the middle. The other British species of the genus are not sufficiently hurtful to call for special mention.

**Remedies.** These are given under **Tortricina**.

**TORTULA** (of Roxburgh). A synonym of **Priva** (which see).

**TORTUOUS.** Having an irregular, bending, and turning direction.

**TORULOSE.** Slightly torose.

**TORUS.** The same as **Thalamus** (which see).

**TOTARA PINE.** See *Podocarpus Totara*.

**TOUCH-ME-NOT.** See *Impatiens noli-metangere*.

**TOURNEFORTIA** (named in memory of Joseph Pitton de Tournefort, 1656-1708, the distinguished author of an arrangement of plants under the title of "Institutiones Rei Herbariæ"). Including *Messerschmidia*. ORD. *Boraginææ*. A large genus (nearly 100 species) of stove, greenhouse, or hardy trees or shrubs, sometimes sarmentose or twining, very rarely sub-shrubs, broadly dispersed over the warmer regions of the globe. Flowers rather small, cymose; calyx five-parted; corolla with a cylindrical tube and five imbricated or induplicate lobes; stamens five, affixed to the tube, included. Leaves alternate, entire. The species have little or no horticultural merit. Only two call for mention here: both thrive in any fairly good soil. Propagation may be effected by cuttings, inserted in sand, under a glass, with heat in the case of *T. heliotropioides*, which is the prettiest plant of the genus.

**T. fruticosa** (shrubby). fl. sweet-scented; corolla yellow, salver-shaped, the tube much longer than the calyx; cymes terminal, loosely trichotomous-corymbose. June. l. petiolate, lanceolate or elongated ovate-lanceolate, acuminate, rather obtuse at base, 3 in. long. h. 4 ft. Canaries, 1800. Greenhouse shrub. (B. R. 464.)

**T. heliotropioides** (Heliotrops-like). Summer Heliotrope. fl. the colour and shape of those of the common Heliotrope (*H. peruvianum*), but devoid of scent. May. l. elliptic, obtuse, pubescent on both sides, the margins undulated. Branches terete, and, as well as the petioles, hairy. h. 2 ft. Buenos Ayres, 1823. Stove sub-shrub. (B. M. 3096.)

**TOURRETIA** (named in honour of Marc Antoine Louis Claret de la Tourrette, 1729-1793, a friend of Rousseau, and author of several botanical works). *SYNS.* *Dombeya*, *Medic.* *ORD.* *Bignoniaceæ*. A monotypic genus. The species is a hardy, climbing herb (or sub-shrub?), usually treated in gardens as an annual. Seeds should be sown, early in spring, on a hotbed. When the young plants are strong enough to handle, they may be planted in light soil, against a wall or pillar.

**T. lappacea** (Bur-like). *fl.* in long, spicate racemes, on terminal peduncles; calyx two-parted, deciduous; corolla purple-violet, with a very unequally bilabiate limb; stamens four, didynamous. July. *l.* opposite, di- or trichotomously divided; segments petiolulate, membranous, serrated; petioles produced into a branched tendril or leaflet. Branches slender, tetragonal. *h.* 6ft. Mountains of tropical America, 1788. (B. M. 3749.)

**TOVARIA**. A synonym of *Smilacina* (which see).

**TOVOMITA** (from *Toromita*, the Caribbean name of *T. guianense*). *SYNS.* *Beauharnoisia*, *Marialva*, and *Micanthera*. *ORD.* *Guttiferae*. A genus comprising about a score species of tropical American, stove trees or shrubs, with resinous juice. Flowers often rather small, cymose-umbellate or in dense panicles; sepals two or four; petals four to ten, imbricated, often twin-seriate; stamens indefinite. Fruit often obovoid-oblong or pyriform. Leaves penninerved. The three species introduced are handsome trees, thriving in a mixture of loam, peat, and sand. Ripened cuttings will root freely in sand, under a hand glass, in heat.

**T. choisyana** (Choisy's). *fl.* yellow; sepals four, the two inner ones petaloid; petals eight to eleven; pedicels shorter than the flowers; male cymes terminal, few-flowered. May. *l.* oblong, neuter at base, shortly and rather obtusely acuminate at apex, entire. *h.* 20ft. Cayenne, 1823. *SYN.* *Micanthera elusiofolia*.

**T. fruticifera** (pendulous-fruited). *fl.* yellowish, on jointed pedicels; sepals two; petals four; peduncles filiform, axillary and terminal, two or three-flowered, elongated. January and February. *fl.* turbinate, pendulous, crowned by the permanent styles. *l.* oblong, acutely and sharply acuminate, 3in. long. *h.* 18ft. Peru. *SYN.* *Beauharnoisia fruticifera*.

**T. guyanensis** (Guiana). *fl.* dioecious; sepals two; petals four, green; anthers white; pedicels jointed; peduncles corymbose, dichotomous, thick, terminal. June. *l.* ovate-oblong, bluntly acuminate, somewhat stem-clasping, coriaceous, 4in. to 5in. long, white beneath. *h.* 10ft. Guiana and Brazil, 1827. (A. G. 364.) *SYN.* *Marialva guyanensis*.

**TOWN CRESS**. A common name for *Lepidium sativum* (which see).

**TOXICODENDRON** (from *toxicon*, poison, and *dendron*, a tree; alluding to the poisonous nature of the fruits). *SYN.* *Hydnachne*. *ORD.* *Euphorbiaceæ*. A small genus (two species) of small, rigid, much-branched, greenhouse trees, endemic in South Africa. Flowers dioecious, apetalous, axillary, the males densely cymulose and shortly pedunculate, or loosely racemose, the females solitary, shortly pedicellate. Capsule sub-globose, thick, hard. Leaves opposite or often whorled, entire, rigidly coriaceous. *T. capense*, the only species introduced, succeeds in well-drained, sandy loam. When at rest, water should be sparingly given. Propagation may be effected by cuttings, inserted in sandy soil, under a bell glass.

**T. capense** (Cape of Good Hope). *fl.* male panicle about one-third the length of the leaves, slightly puberulous, cluster-flowered; bracts thick, ovate-lanceolate. June. *l.* sub-lanceolate, linear, narrowly oblong, or elliptic, cuneate-narrowed at base, rounded and obtuse at apex, paler beneath, glabrous. Flowering branches terete. *h.* 5ft. to 6ft. 1783. *SYN.* *Hydnachne globosa*.

**TOXICOPHLEA** (from *toxicon*, poison, and *phloros*, bark; in allusion to the poisonous rind). *SYN.* *Acokanthera*. *ORD.* *Apocynaceæ*. A small genus (three species) of very poisonous, tall, greenhouse shrubs or small trees; two are natives of South Africa, and the third is Abyssinian. Flowers white, or pink on the outside, odorous; calyx five-parted, eglandular; corolla salver-shaped, with a cylindrical tube and five twisted lobes; cymes sub-racemose, dense, sub-sessile in the axils. Berry globose, one or two-seeded. Leaves opposite, thickly coriaceous, obliquely penninerved.

**Toxicophlæa**—continued.

The two introduced species thrive in a light, rich soil, with an occasional watering of weak liquid manure. Cuttings root readily under a hand glass, in moderate heat.

**T. cestroides** (Cestrum-like). A synonym of *T. Thunbergii*.

**T. spectabilis** (showy). \* Wintersweet. *fl.* white, in terminal and axillary corymbs, which form a very large, dense spray, frequently over 2ft. in length; perfume sweet and powerful. Spring. *l.* elliptic. *h.* 4ft. to 6ft. South Africa, 1872. (G. C. 1872, 363; G. N. July, 1877; R. H. 1879, 270.)

**T. Thunbergii** (Thunberg's). *fl.* yellowish, tipped with brown, expanding in the afternoon; corymbs sessile, axillary, usually eight-flowered. February to April. *l.* lanceolate-oblong, coriaceous. *h.* 6ft. to 7ft. Cape of Good Hope, 1787. The correct name of this plant is now *Acokanthera venenata*. (L. H. 1855, 543.) *SYN.* *T. cestroides* (R. G. 940; R. H. 1880, 370).

**TOXOSTIGMA**. A synonym of *Arnebia* (which see).

**TRACHEA** (derivation uncertain). A small genus of Night-moths (*Noctuæ*), of which only one species, *T. piniperda*, or the Pine Beauty Moth, is found in Britain. The



FIG. 67. TRACHEA PINIPERDA.

size, form, and markings of the moth are shown in Fig. 67. The front wings are brick-red, or reddish-brown, mixed with grey and pale orange; there are darker oblique cross-lines, and whitish spots towards the middle of each wing, the centre of the larger spot being filled up with orange-grey. The moths fly in the early spring. The larvæ are slender; when full-grown, they are yellowish-green, with a white line down the middle of the back, and a double line (white above, and orange beneath) along each side above the legs. The young larvæ are of a uniform green colour. They feed on the leaves of Fir-trees during summer, and, when full-fed, spin slight cocoons in crevices of the bark, or under the soil, and in them become brown pupæ.

Where these Moths are conspicuously hurtful to Conifers, their numbers may be reduced by shaking them off the branches, and preventing them from ascending the trunk by putting a ring of tar around it. The pupæ also should be sought for in the crevices of the bark, and by turning up the soil around the trunks to a depth of three or four inches. This insect is, however, seldom so abundant as to do much harm in any part of Britain.

**TRACHEA, TRACHENCHYMA**. Spiral vessels; air-tubes, containing a spiral thread of considerable toughness and elasticity.

**TRACHELIUM** (from *trachelos*, the neck; alluding to the supposed efficacy of the plants in diseases of the trachea). Throatwort. *ORD.* *Campanulaceæ*. A small genus (four or five species) of hardy, perennial herbs or sub-shrubs, natives of the Mediterranean region. Flowers sub-umbellate or in a corymbosely-branched panicle; calyx tube adnate, the limb five-parted; corolla narrow-tubular, shortly five-lobed at apex; stamens free. Leaves exstipulate. Only one species calls for mention here. It thrives in a compost of sandy loam and vegetable mould. Increased by seeds, sown on a slight hotbed, in spring; or by cuttings of young shoots, inserted in sandy soil, in April, or at the end of summer.

**T. cæruleum** (blue). *fl.* small, very numerous, corymbose; corolla violet-blue, salver-shaped, with a long and very narrow tube. August. *l.* ovate, acute, deeply serrated, on short petioles. Stem erect. *h.* 2ft. Italy and Spain, 1640. (B. R. 72.)

**T. c. album** (white). This only differs from the type in having white flowers.

**TRACHELOSPERMUM** (from *trachelos*, the neck, and *sperma*, a seed; alluding to the apical elongation of the seeds). **SYNS.** *Parechites*, *Rhynchospermum* (of Lindley). **ORD.** *Apocynaceæ*. A small genus (four species) of stove or greenhouse shrubs, inhabiting the East Indies, the Malayan Archipelago, and Eastern Asia, extending as far as Japan. Flowers white, in loose, terminal or pseudo-axillary cymes; calyx small, five-parted, with five to ten glandular scales at base within; corolla salver-shaped, with a cylindrical tube, a constricted throat, and five oblong, twisted lobes; filaments very short; disk annular, truncate or five-lobed. Leaves opposite, scattered, pinnate. *T. jasminoides* is a pretty, greenhouse climber, of easy culture in a compost of light loam and peat. It may be readily increased by cuttings.

**T. jasminoides** (Jasmine-like). \* *fl.* white, very fragrant, several in a cyme; corolla tube contracted below the middle, hairy within at the mouth, the lobes wavy, with reflexed margins; peduncles solitary, axillary or terminal, much longer than the leaves. July. *l.* on very short petioles, ovate-lanceolate, acute, the younger ones pale yellow-green. Shanghai, 1846. **SYN.** *Rhynchospermum jasminoides* (B. M. 4737; J. H. S. i., p. 74; L. & P. F. G. ii. 147).

**T. j. angustifolium** (narrow-leaved). A form with smaller, narrower leaves than the type; it proves hardy when grown against a wall in the open air in the south of England. **SYN.** *Rhynchospermum angustifolium*.

**TRACHYCARPUS** (from *trachys*, rough, and *karpus*, fruit; probably in allusion to the rough, hairy fruit). **ORD.** *Palmeæ*. A small genus (four species) of greenhouse or half-hardy, unarmed Palms; two inhabit the mountains of North India and Burmah, the third is Chinese, and the fourth Japanese. Flowers yellowish, small; spathes many, rather large, compressed, obliquely cut, thickly coriaceous, tomentose; spadices many, short or elongated, robust, densely or loosely flowered. Fruit yellowish, small, globose, ellipsoid, or sub-reniform, one-seeded. Leaves terminal, orbicular or semi-orbicular, deeply plicate-multifid; segments narrow, induplicate bifid; rachis none; ligule very short; petioles biconvex; sheath entire. Caudices solitary and tall, or dwarf and tufted. The species are of very easy culture in a compost of rich, strong loam, to which is added a small portion of vegetable mould and sand. Perfect drainage, and copious supplies of water throughout the summer, are most essential to success. Propagation may be effected by suckers, which generally appear in considerable quantities; or by seeds.

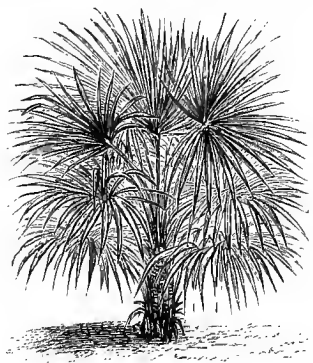


FIG. 68. TRACHYCARPUS EXCELSUS, in a Young State.

**T. excelsus** (tall). \* *fl.* spadix 1 ft. long, duplicate branched; spathes membranous, fuscous, tubular, bifid at apex. *l.* in young specimens oblong, in adults transversely oblong, concave, digitately multipartite, 1 ft. in diameter; segments fifteen to sixty, linear, somewhat obtuse, bidentate or shortly bifid, the teeth or segments obtuse; petioles above loosely concave, below convex, 1 ft. long, the margins smooth or armed with small teeth. *h.* 2 ft. China and Japan, 1844. See Fig. 68. (F. d. S. 2368.) **SYN.** *Chamærops excelsa*.

**T. Fortunei** (Fortune's). \* *fl.* yellow; inflorescence densely paniculate, more than 9 in. long. *l.* semi-orbicular, flabellate, 1 ft.

### Trachycarpus—continued.

long and broad, cut half-way or more down; segments 2 in. to 1 in. broad, pendulous towards their tips; petioles 1 ft. or more long, unarmed, or the margins very obscurely toothed. Caudex 8 ft. to 12 ft. high, the lower portion marked with the scars of fallen leaves. China, 1849. Hats, brooms, brushes, cordage, sandals, and whole dresses, are made, by the natives, of the fibrous sheaths of old leaves. (G. C. n. s., xiv., p. 305.) **SYN.** *Chamærops Fortunei* (B. M. 5221).

**T. khasyanus** (Khasyan). *fl.* spadix 1 ft. long, the lower half concealed by the spathes, of which there are three; branches of the spadix exerted, quite naked. *l.* flabelliform, reniform, 2 ft. long, 3 ft. wide; segments about sixty-five, the lateral ones shortest, 12 in. to 14 in. long, but more deeply divided than the others, linear, their segments 2 in. to 3 in. long, narrow, acute; petioles 1 ft. long, with irregular, denticulate margins. Trunk 5 in. in diameter. *h.* 9 ft. Khasya Mountains. **SYN.** *Chamærops khasyana*.

**T. Martiana** (Martius). *fl.* spadices many, in adults much-branched, spreading, many-flowered. *fr.* ovate, sub-solitary, lepidote. *l.* palmately multifid; segments bifid at apex; sheath cylindrical, obliquely truncate. Caudex 26 ft. high, cylindrical above, 4 in. to 6 in. in diameter, fuscous-cinereous, marked with the scars of fallen leaves. Himalayas. **SYN.** *Chamærops Martiana*.

**TRACHYMENE** (from *trachys*, rough, and *hymen*, a membrane; alluding to the channels of the fruit). **SYNS.** *Didiscus*, *Huegelia*. **ORD.** *Umbelliferae*. A genus comprising about fourteen species of stove or greenhouse, annual or perennial herbs; one inhabits New Caledonia, another Borneo, and the rest are endemic in Australia. Flowers white or blue, in simple umbels; calyx teeth minute or obsolete; petals entire, obtuse, imbricated; involucre bracts linear, often connate. Leaves ternately dissected or rarely undivided, toothed; stipules wanting. *T. cærulea*, the only species worth describing in this work, is a rather coarse, erect, more or less hirsute, greenhouse annual or biennial. It should be raised from seeds, sown on a gentle hotbed.

**T. cærulea** (blue). *fl.* usually blue; petals unequal; involucre bracts numerous, linear; peduncles long, each bearing an umbel of very numerous flowers, 1 in. to 2 in. in diameter. July. *l.* once or twice tripartite; lobes linear-cuneate, trifid or incised, acute; upper floral leaves small, simple or trifid. *h.* 1 ft. to 2 ft. West Australia, 1827. (B. R. 1225.) **SYN.** *Didiscus cæruleus* (B. M. 2875).

**TRACHYMENE** (of De Candolle). A synonym of **Siebera** (which see).

**TRACHYNOTIA**. A synonym of **Spartina** (which see).

**TRACHYSTEMON** (from *trachys*, rough, and *stemon*, a stamen; alluding to the villous filaments of one of the species). **SYNS.** *Nordmannia*, *Psilotemon*. **ORD.** *Boraginææ*. A genus including only a couple of species of hardy, erect, branched, hispid, perennial herbs, found in the Orient. Flowers pink or white, pedicellate; calyx five-cleft; corolla tube cylindrical, five-angled within, the five lobes linear, spreading, or at length revolute; stamens five; cymes rather loose, bundle-flowered. Nutlets four, erect. Radical leaves often ample, long-petioled; cauline ones few, alternate. *T. orientalis*, the only species calling for description here, thrives in ordinary soil; it may be multiplied by seeds, or by divisions.

**T. orientalis** (Eastern). *fl.* purplish-blue, copious, on long pedicels; corolla lobes revolute, pilose outside at the apex. March to May. *l.* hispid, broad; lower ones cordate; upper cauline ones ovate-lanceolate, narrowed at base. Stem hispid. *h.* 1 ft. to 2 ft. 1752. (G. C. n. s., xiv., p. 17.) **SYN.** *Borago orientalis* (B. R. 288; S. F. G. 175).

**TRACHYTELLA**. A synonym of **Delima** (which see).

**TRADESCANTIA** (named in honour of John Tradescant, gardener to Charles I.; he died in 1638). Spiderwort. **SYN.** *Ephemerum*. Including *Descantaria*, *Pyrrheima*. **ORD.** *Commelinææ*. A genus comprising about thirty-two species of stove, greenhouse, or hardy, perennial herbs, natives of North and tropical America. Flowers more or less pedicellate, numerous or few in a cyme, very rarely solitary; sepals distinct, concave, green or coloured; petals distinct, obovate or orbicular, sub-equal; stamens six,

**Tradescantia**—continued.

all usually perfect; cymes simple, variably disposed. Leaves variable. Stem simple or branched, diffuse, ascending, or erect. The best species are here described. They are amongst the easiest of plants to cultivate. Cuttings of the stove and greenhouse species root readily at almost any season, if inserted in light soil, in moderate heat. The hardy *Tradescantias*, of which *T. virginica* is one of the best, may readily be propagated by division; the plants succeed in ordinary garden soil.

**T. caricifolia** (Sedge-leaved). A synonym of *T. virginica*.

**T. crassifolia** (thick-leaved). *fl.* resembling those of *T. virginica*; sepals whitish, woolly; petals purplish-rose or blue; umbels three to six on a branch, sessile, axillary, the upper with two bracts, the lower with one. August. *l.* ellipsoid or narrow-lanceolate, woolly-villous beneath. Stem scarcely divided. Root a large tuber. *h.* 2 ft. Mexico, 1796. Half-hardy. (B. M. 1598.)

**T. o. acanthis** (stemless). Stem shorter or scarcely any. (B. R. 1840, 34, under name of *T. iridescens*.)

**T. c. glabrata** (glabrous). *fl.*, sepals white-woolly. *l.* glabrous on both sides, the margins white-woolly. SYN. *T. speciosa*.

**T. crassula** (rather thick). *fl.*, sepals hairy-pilose; petals white; umbels many-flowered, loose, mostly terminal, rarely also one or two in the axils; pedicels glabrous. July. *l.* oblong, rather obtuse, 4 in. long, glabrous, ciliated-pilose on the margins. Stem glabrous, sub-corymbosely branched. *h.* 1½ ft. Brazil, 1825. Stove. (B. M. 2935; L. B. C. 1560.)

**T. discolor** (discoloured). A synonym of *Rhoeo discolor*.

**T. elata** (tall). A synonym of *T. virginica*.

**T. erecta** (erect). A synonym of *Tinantia fugax erecta*.

**T. fuscata** (fuscous). *fl.*, sepals rather thick, densely rusty-hairy outside; petals bluish-purple, round; peduncles axillary, crowded, one to three-flowered. September. *l.* 6 in. to 8 in. long, oblong, acute, scarcely acuminate, narrowed or attenuated at base, more or less petiolate. Stem short or scarcely any, clothed with dark sanguineous hairs. Brazil, 1820. Stove. (B. M. 2330; B. R. 482; L. B. C. 374.) SYN. *Pyrrhelia Loddigesii* (of gardens).

**T. glabra** (smooth). A synonym of *T. virginica*.

**T. iridescens** (iridescent). A synonym of *T. crassifolia acanthis*.

**T. latifolia** (broad-leaved). A synonym of *Tinantia fugax erecta*.

**T. multiflora** (many-flowered). *fl.*, sepals ovate, hairy, equalling the white petals; umbels terminal and axillary; peduncles hairy, shorter than the leaves. June. *l.* ovate, sub-cordate-rounded at base, pointed, 1 in. to 2 in. long. Stem ascending. Jamaica, 1824. Stove. SYN. *T. procumbens*.

**T. navicularis** (boat-shaped). *fl.* similar to those of *T. virginica*; petals of a beautiful pink, twice the length of the navicular sepals; umbel terminal, solitary, many-flowered. Summer. *l.* 2 in. long, sessile, fleshy, navicular, ovate, acute, ciliated on the margins, very thickly dotted beneath. Stem stoloniferous at base, scarcely branched; floriferous branches geniculate-ascending. Peru. Stove. (R. G. 901.)

**T. pilosa** (pilose). A synonym of *T. virginica pilosa*.

**T. procumbens** (procumbent). A synonym of *T. multiflora*.

**T. pulchella** (pretty). *fl.*, sepals and pedicels nearly glabrous; petals rose-coloured or bluish. July. *l.* elliptic-lanceolate or lanceolate, sessile, 2 in. long, acute, often rounded and somewhat stem-clasping at base, glabrous. Stem procumbent; branches sub-erect, glabrous. Mexico, 1825. Greenhouse.

**T. rosea** (rose-coloured). *fl.* ½ in. in diameter; petals bright rose-coloured, three times as long as the ovate-lanceolate sepals; cymes solitary or in pairs, few-flowered; peduncles terminal, 5 in. to 6 in. long. June to August. *l.* linear-lanceolate, fringed on the margins. Stem simple, slender, smooth, 6 in. to 8 in. high. North Carolina, 1802. Hardy. (L. B. C. 370; S. B. F. G. 183.)

**T. speciosa** (showy). A synonym of *T. crassifolia glabrata*.

**T. sub-aspera** (rather rough). A synonym of *T. virginica*.

**T. tumida** (tumid). A synonym of *T. virginica tumida*.

**T. undata** (waving). A synonym of *Tinantia fugax erecta*.

**T. velutina** (velvety). *fl.*, sepals and pedicels softly pubescent; petals purplish-rose; umbels terminal and axillary, many-flowered. May. *l.* 5 in. long, sessile, oblong-lanceolate, acute, densely and softly pilose above, very shortly silky-villous beneath. Stem branched, softly whitish-villous. *h.* 1½ ft. Guatemala, 1850. Stove.

**T. virginica** (Virginian).\* Flower of a Day; Common Spider-wort. *fl.* 1 in. in diameter, closely packed in two rows in the bud, each with an ovate, scarious bract at the base; petals violet, purplish, or whitish, like the style and densely-bearded filaments, twice as long as the lanceolate-ovate sepals; cymes axillary and terminal, sessile, many-flowered. March to May. *l.* linear, broadest at base, mostly purple-veined. Stems 6 in. to 2 ft. high. Florida and northward, 1629. Hardy. (B. M. 105.)

**Tradescantia**—continued.

SYNS. *T. caricifolia* (B. M. 3546), *T. elata* (L. B. C. 1513), *T. glabra*, *T. sub-aspera* (B. M. 1597). Of this species there are several varieties.

**T. v. alba** (white). A variety having white flowers. (B. M. 3501.)

**T. v. pilosa** (pilose). *fl.*, upper umbels many, sessile in the axils of the leaves; lower ones pedunculate, with two lanceolate-linear bracts. (B. R. 1055.) SYN. *T. pilosa* (B. M. 3291).

**T. v. tumida** (tumid). *fl.*, umbels sessile in the axils. Stem thickened. SYN. *T. tumida* (B. R. 1840, 42).



FIG. 69. *TRADESCANTIA WARSCEWICZIANA*.

**T. Warscewicziana** (Warscewicz's). *fl.* many, densely crowded in a branched panicle; sepals and pedicels lilac; petals purple. May. *l.* narrow-oblong, about 8 in. long, acuminate, sessile. Stem robust, erect, 4 in. to 16 in. high. Guatemala. Stove. See FIG. 69. (B. M. 5188.)

**T. zebrina** (Zebrina). A synonym of *Zebrina pendula*.

**TRAGACANTH GUM PLANT.** See *Astragalus Tragacantha*.

**TRAGIA** (named in honour of Jerome Bock, 1498-1554—generally called *Tragus*, the Greek for Bock [Buck]—a German botanist). ORD. *Euphorbiaceæ*. A large genus (about fifty species) of stove herbs or sub-shrubs, inhabiting warm regions. Flowers monœcious, apetalous, racemose. Leaves alternate, petiolate, toothed or lobed. The species, a few of which have been introduced, possess no beauty, and are not particularly interesting.

**TRAGIUM.** Included under *Pimpinella*.

**TRAGOPOGON** (from *tragos*, a goat, and *pogon*, a beard; alluding to the long, silky beard of the seeds). Goat's Beard. Including *Geropogon*. ORD. *Compositæ*.

**Tragopogon—continued.**

A genus of hardy, biennial or perennial herbs, natives of Europe, North Africa, and temperate and sub-tropical Asia. About forty species have been described, but the number may be considerably reduced. Flower-heads yellow or blue (or purple?), terminal, homogamous; ray florets ligulate, truncate, five-toothed; involucre cylindrical or narrowly campanulate, the bracts one-seriate, often much elongated; receptacle flat or at length convex, foveolate; achenes glabrous or slightly hispid; pappus bristles indefinite, one-seriate. Leaves alternate, linear, entire, amplexicaul, often grass-like. A selection of the introduced species is given below. Seeds only require to be sown in ordinary garden soil.

**T. crocifolius** (Crocus-leaved). *fl.*-heads violet, on terete peduncles; involucre five or six-leaved; achenes muricate-scabrous. June. *l.* narrow-linear, straight. *h.* 1ft. Italy, 1739. A glabrous biennial.

**T. glaber** (smooth)\* *fl.*-heads purplish, solitary at the slightly-thickened tips of the stems or branches; involucre eight-leaved, as long as the rays. July. *l.* elongated, half-amplexicaul. Stem simple or rarely branched, terete. *h.* 1½ft. South Europe, 1704. A glabrous biennial. SYN. *Geropogon glaber* (B. M. 479).

**T. major** (greater). *fl.*-heads yellow; involucre of twelve to fifteen scales, the outer ones exceeding the ray florets; peduncles obconical-fistulose at apex. May. *l.* straight, lanceolate-linear, acuminate. *h.* 5ft. Austria, 1788. A glabrous perennial. (J. F. A. 29.)

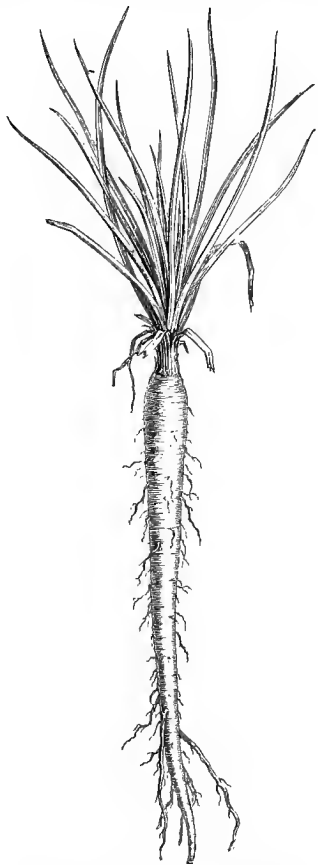


FIG. 70. TRAGOPOGON PORRIFOLIUS.

**T. porrifolius** (Leek-leaved). Salsafy; Vegetable Oyster, &c. *fl.*-heads rose-coloured or flame-purple; involucre of eight scales; peduncles obconical-fistulose at apex. May and June. *l.* straight, lanceolate-linear, acuminate, the sheaths slightly dilated. *h.* 3ft.

**Tragopogon—continued.**

North Europe (naturalised in England). A glabrous biennial. See Fig. 70. (Sy. En. B. 801.) For culture, &c., see **Salsafy**.

**T. pratensis** (meadow-loving). Common Goat's Beard; Noon-flower; Shepherd's Clock; Star of Jerusalem, &c. *fl.*-heads yellow, ½in. to 2in. in diameter; involucre obconical, of about eight bracts, often streaked with brown; scapes scarcely thickened upwards. June and July. *l.* flexuous, gradually contracted upwards; radical ones channelled above. Stems stout, erect, 1ft. to 2ft. high. Europe (Britain). Plant glabrous, or the involucre slightly cotty. Biennial. (Sy. En. B. 798-800.)

**T. roseus** (rose-coloured). A synonym of *T. ruber*.

**T. ruber** (red). *fl.* rose-coloured or diluted with purple, on terete peduncles; involucre of about eight bracts. May. *l.* lanceolate-linear, slightly undulated, glaucous. Stems erect, leafy, glaucous. *h.* 1½ft. Siberia, 1825. Young plant cobweb-woolly. Perennial. SYN. *T. roseus*.

**TRAILERS. See Creepers.**

**TRAINING.** This term, as used in gardening, refers to the management of trees and plants, more especially when in a young state, by regulating their branches to give all a fair amount of space and exposure to light. Many trees and plants, if allowed to grow in a natural way, would assume proportions far beyond the limited accommodation which is available for them when under cultivation, and, besides, would be crowded and unfruitful. Pruning is first of all necessary, but with it Training is closely associated; the branches that are reserved either temporarily or permanently, when pruning, have afterwards to be dealt with in a similar manner in Training. Besides disposing of branches to give all plenty of space and light, there is also the necessity for regulating them, so as to prevent the sap flowing to any one branch, or part of the plant, at the expense of another, and to the detriment of both. An unequal flow of sap causes over-luxuriance in one part, and weakness in another. By Training, much of this irregularity may be prevented; in fact, it is one of the principal objects to be kept in mind. It is pretty generally known, by persons engaged in gardening pursuits, that sap will flow most readily into straight branches, which pass from the root in an upright, or nearly upright, direction, and not so freely into others proceeding obliquely or horizontally from the same starting-point. If, therefore, a tree, which it is desired should be about equally strong in all its branches, shows—as naturally it will do if not attended to—a disposition to

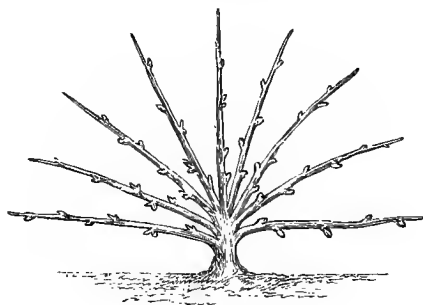


FIG. 71. FAN TRAINING.

grow irregularly, it must be corrected at an early stage. This constitutes one of the principal objects which may be effected by Training. The fact of sap flowing most forcibly into branches trained in an upright direction, supplies the means, as by elevating or depressing the points during the growing season, according to vigour shown, the circulation may be encouraged, or checked, in a most marked manner, and the development will be more generally alike throughout.

In the management of cultivated trees, several methods of Training are adopted, some kinds, and also some



**Training—continued.**

positions, being better adapted for one than for another. Fruit-trees are those more especially referred to; it is an easy matter to train annual climbers, both indoors and out, if only the necessary requirements of the plant are kept in view. The same may also be said of creepers or trailers generally, when their shoots are sufficiently thinned out. The methods of Training a plant to a rafter, on a wire trellis, or round a certain number of sticks, are matters which scarcely need an explanation.

The principal methods of Training adopted for wall-fruit trees are the Fan, Horizontal, Oblique, and Cordon, all being subject, more or less, to modifications; for the open ground, Pyramids, Bushes, and Standards are the shapes most favoured. Fan Training is generally adopted for stone fruits—Apricots, Cherries, Peaches, and Plums. The trees may be worked on dwarf or tall stocks, but on the latter the system is often modified by bringing some of the branches down on either side of the stem when there is space.

Fan Training must be commenced on maiden trees, that is, trees which have been worked the previous year and have made one strong shoot. This is cut down nearly to the point of union, in order to induce the production of shoots therefrom to eventually form the principal branches. One of the chief conditions to be aimed at in Fan Training is to get the head equally balanced, by having the same number of shoots on one side of the centre as on the other, as shown, for example, in Fig. 71. If sufficient can be secured the first year for starting an evenly-balanced head, an advantage is gained which the tree will always show afterwards. Should a young tree start irregularly, and misplaced shoots be allowed to develop for a season, it is not an easy matter then to secure others where they are wanted from the base. Sometimes, trees are cut hard back a second time, but this is a most objectionable practice; the less severe cutting is resorted to, the better, as it invariably leads to branches dying away sooner or later. By regulating the young shoots, depressing the stronger and elevating the weaker ones, much may be done to equalise the flow of sap, and render them all of about equal dimensions at the end of the season. In this and in other systems of Training, much has to be known by the operator from practical experience in the work, and constant attention is necessary from the first, to keep the shoots properly

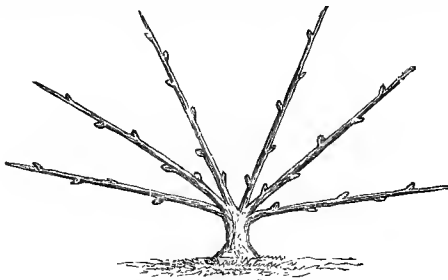


FIG. 72. FAN TRAINING.

disposed and the sap regulated. Fig. 72 represents a tree trained without a centre shoot; the sap in such a tree would be equally distributed on both of the sides, and it is a comparatively easy matter to get the centre filled up when once the sides are equalised and the main branches established.

Horizontal Training is largely employed for Pear-trees, and sometimes for Apples that are to be grown against

**Training—continued.**

walls or as Espaliers in the open ground. Espalier trees are sometimes trained on horizontal wires, as shown in Fig. 73. When there is a great length, and in a straight line, wires are preferable to stakes, if only for their durability. A young tree with a single upright stem is cut

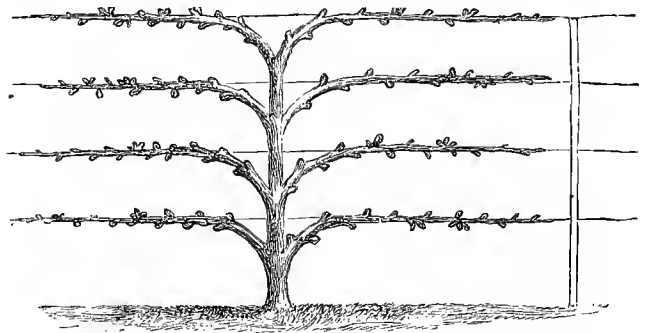


FIG. 73. HORIZONTAL TRAINING FOR ESPALIER TREES ON WIRES.

down to about 12in. from the ground, provided there are three buds situated near that point, one on either side, and one in an eligible position for growing to form the leader. The two side shoots should be trained on an angle for the first year, and induced to grow, if possible, with equal vigour; they can afterwards be

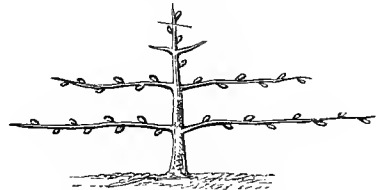


FIG. 74. HORIZONTAL TRAINING.

gradually brought down to a horizontal line, to form bottom branches. At pruning time the next year, the leader is again cut down immediately above three other buds similarly situated as in the first year, but some 10in. or 12in. higher up, according to the distance required between the horizontal branches. Thus the work proceeds each year (as shown in Fig. 74); every pair of branches is

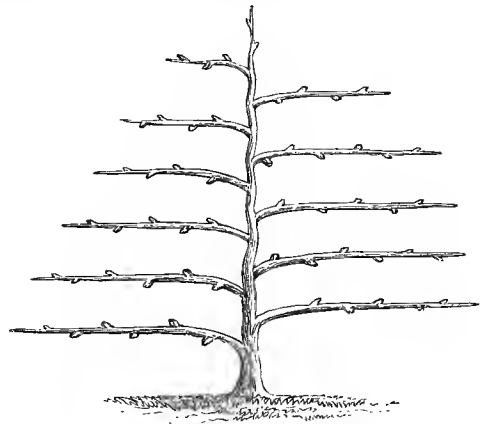


FIG. 75. HORIZONTAL TRAINING.

**Training—continued.**

therefore, in an established tree, a year older than the pair situate immediately above. Unfortunately, it is not safe to attempt more than one step up each year, although, with vigorous trees and a good climate, two may occasionally be secured by stopping the centre shoot in summer

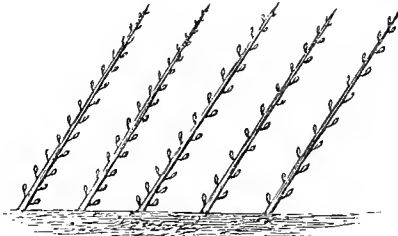


FIG. 76. SINGLE OBLIQUE CORDONS

at the proper distance up, and training the laterals. This is not recommended, as it cannot be expected that a lateral from a young shoot will ever mature and form a branch equal in strength to another which starts from a ripened bud. Some prefer Training the branches on either side, so that they come alternately (see Fig. 75);

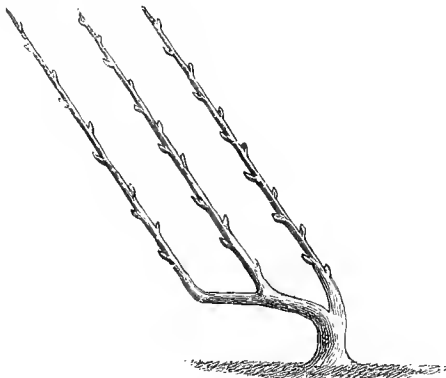


FIG. 77. TREBLE OBLIQUE CORDON.

but it is not always certain that every branch can be secured just at the point where it is wanted to insure alternate regularity.

In Oblique Training, a centre stem is reserved as in the Horizontal method; but the side branches are allowed to point upwards, instead of being kept to a level. This



FIG. 78. DOUBLE HORIZONTAL CORDON.

allows a freer circulation of sap, for the reason which has been already explained: the system, therefore, favours weak-growing sorts, and may be adopted with success for Peaches and Nectarines, where the Horizontal would not answer.

Cordon Training admits of a large number of trees being cultivated in a comparatively small space. Apples, Pears, and Cherries, the fruits of which are borne on small spur branches, are specially adapted for Training as Cordons. They need but little room, as the branches may

**Training—continued.**

be kept pinched back during summer. Single Cordons consist only of a single stem, which may be formed from a strong maiden tree. These may often be planted about 2ft. apart, and trained obliquely, as shown in Fig. 76. Other oblique forms of Cordons are trained with two, or even three stems (as in Fig. 77). Horizontal Cordons are best adapted for training along the sides of walks, or to form an edging or boundary to fruit-tree quarters, &c. The method of Training a Double Horizontal Cordon



FIG. 79. SINGLE HORIZONTAL CORDON.

is shown in Fig. 78, and the Single, which is necessary for the ends, or where there are intersecting walks, in Fig. 79.

Pyramid Training is available for Pears, Apples, and Plums, also Cherries for pot-culture, and for outside in places where they can be depended upon to succeed away from a wall. There are several modifications of Pyramid Training, that most generally seen being an upright stem furnished with branches from bottom to top, which vary

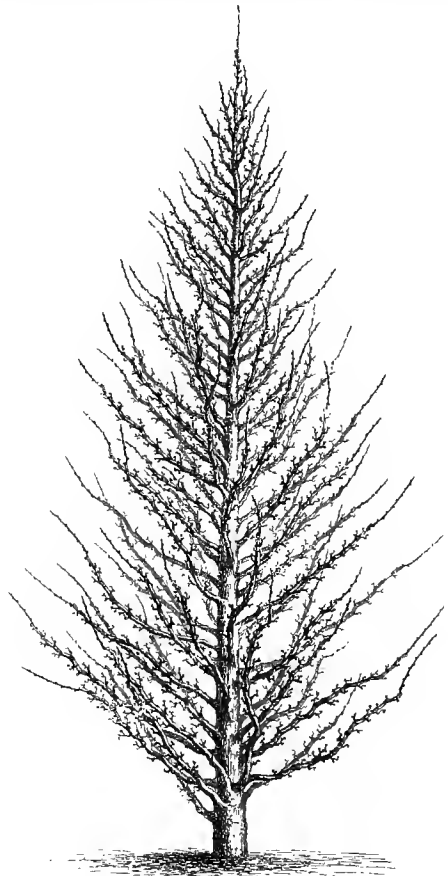


FIG. 80. PYRAMID TREE.

in length, so as to form a pyramidal outline (see Fig. 80). The branches require regulating and stopping, as the trees grow, to keep a free circulation amongst them; and to

**Training—continued.**

obtain good specimens it is necessary to adopt a considerable system of Training in the early stages, by tying branches to fill up blanks, depressing the points of

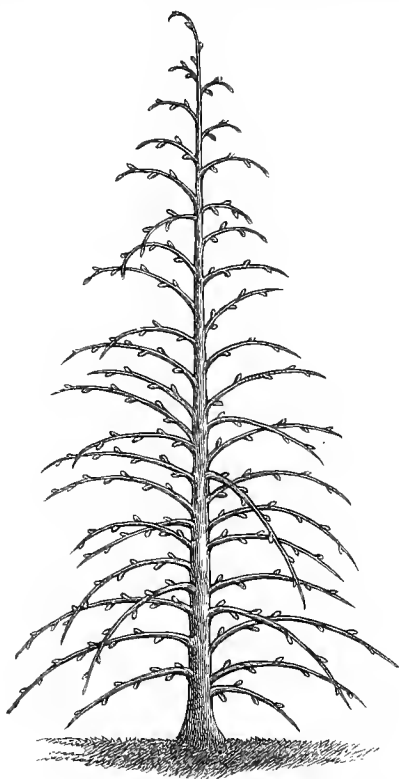


FIG. 81. PYRAMID TRAINING, WITH BRANCHES BENT DOWNWARDS.

vigorous shoots, and encouraging weaker ones to grow more freely. When Pyramids are inclined to grow

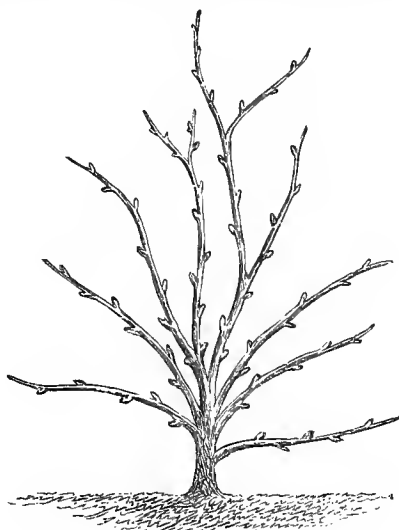


FIG. 82. BUSH TRAINING.

**Training—continued.**

unduly strong, and make long shoots in place of fruiting spurs, a method of tying or bending down the points of the branches may be practised with advantage, on some of the strongest only, if this is considered sufficient. The

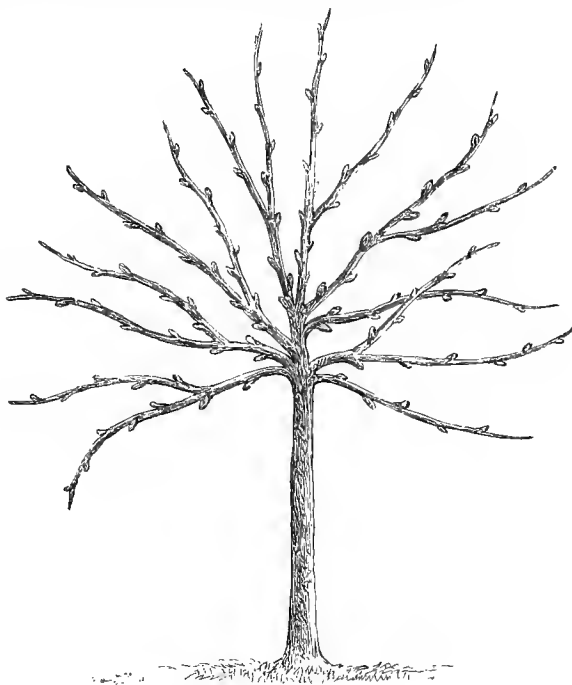


FIG. 83. STANDARD TREE.

tree would then appear as in Fig. 81, a habit which is sometimes naturally assumed by large pyramid Pear-trees of some varieties. Bush trees are practically Pyramids with the leader taken out; they need but little in the

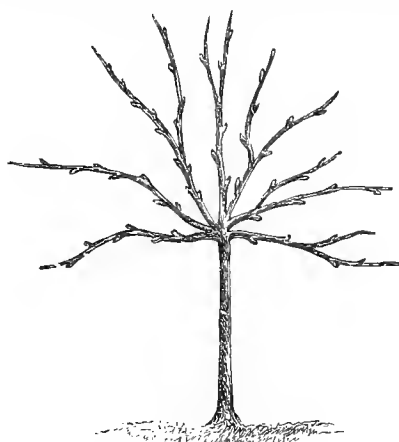


FIG. 84. HALF-STANDARD TREE.

way of Training beyond thinning to prevent overcrowding. Bush-trained trees (see Fig. 82) of Apples and Pears, the former worked on the Paradise-stock, and the latter on the Quince, are especially adapted for small gardens:

**Training—continued.**

they are usually very productive, and require but little space.

Standard Training is best suited for orchards, market gardens, &c., where grass is grown beneath, and cattle or sheep feed thereon, or where other crops and bush fruit-trees are cultivated amongst them. There is no great necessity for Training Standard trees artificially; their heads develop evenly enough, as a rule, if they are kept sufficiently thinned, after being shortened back for the first year or two to get the foundation. Standard

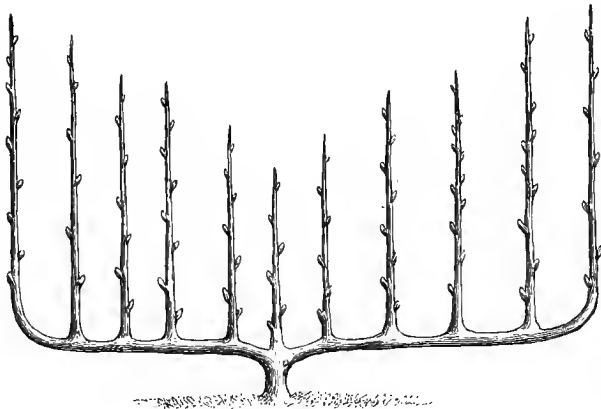


FIG. 85. VERTICAL OR UPRIGHT TRAINING.

Training (see Fig. 83) is suitable for Apples, some kinds of Pears, Plums, and Cherries, in favoured localities. A Half-Standard (Fig. 84) is simply a Standard with a shorter stem.

Vertical or Upright Training requires a considerable amount of management in keeping the upright shoots

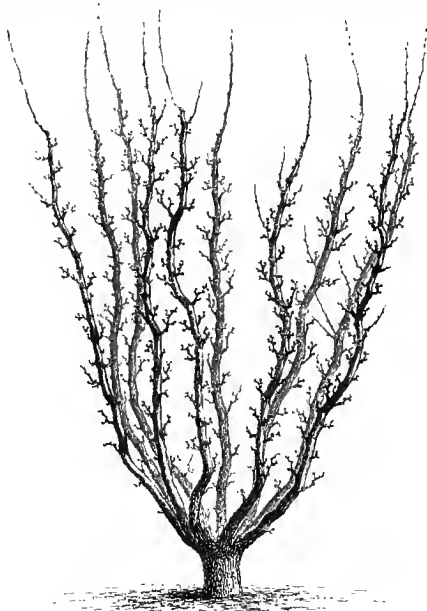


FIG. 86. APPLE-TREE TRAINED VASE-SHAPE, WITH DWARF STEM AND UPRIGHT BRANCHES.

**Training—continued.**

regulated and the tree evenly balanced. Two shoots must first be trained horizontally, and their points turned to form the uprights at the extreme ends (see Fig. 85). These must be kept in advance of all the others in the Training process; the centre will then be the last part of the tree to be furnished. This system is not so widely practised as others which have been already noticed.

Apple-trees trained in the shape of a vase, with dwarf stem (see Fig. 86), are very ornamental for lawns, &c., apart from the value of the fruit which is generally produced by them when established and kept pruned annually.

References to the methods of Training adapted to the various kinds of fruits named may be found under **Cherry, Currant, Fig, Gooseberry, Nectarine, Pear, Plum, Vine, &c.**

**TRAMETES** (from *trama*, the layer in *Hymenomyces* that supports the hymenium, or spore-bearing surface on each side of it, in the gills or in the partitions between the pores). A genus of Fungi nearly allied to **Polyporus** (which see), from which, indeed, it differs in little save that in *Trametes* the substance of the trama is similar to that of the pileus, while in *Polyporus* it is different. The general form of the Fungi in the genus, and the situation and appearance of the pores in which the hymenium is situated, are well exemplified in *T. Pini*

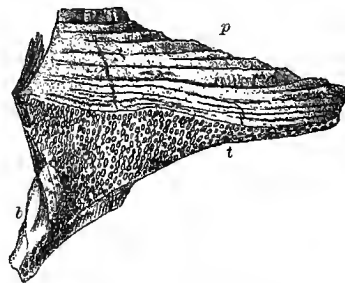


FIG. 87. *TRAMETES PINI*, showing (*p*) Pileus and (*t*) Openings of Spore-bearing Tubes. *b*, Bark of Fir-tree.

(see Fig. 87). Nine species have been discovered in Britain, growing on various trees and shrubs, but all rare. *T. Pini* is, however, by no means rare on the Continent, where it sometimes does great injury to living Conifers, chiefly to Pines and Larches, but also frequently to Spruces, and less often to Silver Firs. In these trees it produces a condition known as the "Red Rot." The reproductive organs of the Fungus grow out of the sides of the trees, as rusty-brown masses of the form figured, and are from 3 in. to 6 in. across; and they continue to slowly increase in size for a long time. The wood is destroyed by the action of the mycelium of the Fungus. The other species of *Trametes* are not very hurtful. Hartig's *T. radiciperda* is a synonym of *Polyporus annosus*, which is a most dangerous foe to Conifers, and also, though less often, to dicotyledonous trees, destroying the roots and trunks.

**Remedies.** The treatment required is similar to that recommended for **Polyporus**.

**TRANSPLANTING.** The act of removing any plant or tree from one situation, and transferring it to another, lifting it bodily, and placing the roots in new soil. The operation is one which is of the greatest practical utility, and is in daily practice on a most extensive scale. Because of the possibility of Transplanting, seedlings may be raised in immense quantities in a comparatively small space, and carefully tended in the younger stages of growth; plants and trees that are gradually developing may be lifted, and allowed additional

**Transplanting**—*continued.*

space according to their requirements; and others, with some few exceptions, that reach a considerable size, may, with proper appliances, be transferred to particular situations for producing an immediate effect. Transplanting forms one of the chief divisions of labour in nurseries, where, by its aid, thousands of plants are being continually prepared, in a limited area, for dispersing, eventually, over hundreds of acres of land. Fruit-trees may also be prepared in any quantity in nurseries, and grown, if desired, into a size large enough for bearing, when, at the proper season, they may be safely lifted and despatched for planting elsewhere, in private and other establishments.

In private gardens, Transplanting of seedlings of various descriptions and sizes forms part of the routine work, more or less, all the year round, but more especially in spring and early summer. Amongst the most important points to consider are the proper seasons for performing the work successfully, the previous preparation of the ground, and also the plants, if necessary, the operation of lifting, conveying to the new situation, and replanting, and after-management until the roots have re-established themselves. It scarcely need be said that considerable knowledge of the subject, and the exercise of much judgment and care, are necessary for Transplanting on an extensive scale, and with success. Some of these provisions are always essentials in the management of every garden. It is next to impossible to lift a plant that has been growing in the ground, and place it again in soil elsewhere, without cutting or breaking some of the roots, which, at least in a young state, are invariably tender in nearly every kind of tree and plant. In some cases this is comparatively unimportant—it may even be advantageous—but in others it may be quite the reverse. Sometimes, the spongioles, which extract nourishment from the soil, are numerous, and if a few become injured, there are plenty left for sustaining the plant; in other instances, there are but few, and then a greater risk is incurred. The proper season for Transplanting depends upon the kind of plant. Seedlings of vegetable crops, and tender or half-hardy plants raised under glass, generally need inserting into new soil soon after they become large enough to handle, in order to allow each individual more space and to prevent injury from overcrowding. The operation may have to be repeated, in some instances, two or three times before the permanent positions are reached; but, as a rule, it is with such plants one of the easiest performed, the chief precautions requisite being a good watering and shade for a few days, should it be necessary. Transplanting is, however, always best performed in dull, mild, and preferably damp weather: there is then less evaporation going on, and the ground is usually in better condition for working. Dry weather is not favourable for the work; it is important to watch opportunities, and never to lift plants until the new situation has been prepared for receiving them. The act of pricking out seedlings and frequently removing plants when in a young state, so far as may be consistent with their well-being, causes an increase of roots and also keeps them closer to the base. This is an advantage, inasmuch as every operation renders success in any subsequent Transplanting more certain, because of its effect in preventing an unlimited extension of the main spongioles. Beyond the recommendation that all seedling plants raised under glass and in seed-beds, for growing out of doors, should be moved, so far as possible, only when the weather is favourable for a quick renewal of growth, little further need be said here respecting them. Root action takes place most quickly when the soil is light; it is therefore a good plan generally to provide a light compost for seedlings, even if they require to be transferred into a heavier one when more fully developed.

**Transplanting**—*continued.*

The Transplanting of fruit-trees, ornamental and forest-trees, and shrubs of every description, into what may be considered more or less permanent quarters, forms annually a very important undertaking in many establishments, particularly when alterations are taking place, and new gardens or grounds are being laid out. As the usual sources of supply are the nurseries, the trees have often to be forwarded a long distance before reaching their destination. This not unfrequently has an injurious effect if the soil falls away when unpacking, or the roots become dry from a certain amount of exposure, which is often unavoidable. There is a vast difference between Transplanting trees or shrubs from one place to another in the same garden, and procuring them from a nursery. In the former case, the roots need only be exposed for a very short time if the work is properly managed, and, providing the weather is favourable, it may be conducted at seasons when long exposure would entail certain loss. Frequent Transplanting in the nursery keeps, as already noted, the roots close home, and this renders lifting and packing a more successful process than it otherwise would be. Trees and plants of any description should never be longer on a journey than is really necessary; they should be unpacked immediately on reaching their destination, and, if they cannot be immediately planted in their new quarters, the roots should be covered with soil. Root action may, and doubtless does, in many subjects, recommence gradually, very soon or directly after the work of Transplanting is completed: hence the importance of placing trees or plants at once in permanent positions, to prevent further disturbance.

The methods of Transplanting vary considerably in detail, according to different plants, and the manner in which their roots are naturally disposed. Some are deep, others shallow, rooting; and at times it is desirable, as in the case of some fruit-trees, to check the natural tendency when Transplanting, and to place roots in a horizontal direction, instead of allowing them to proceed downwards. There are some directions which are generally applicable, and these may be briefly referred to; the special details attending the management of individual plants or kind of trees can only be given in dealing with their cultivation separately. Usually, the hole should be first prepared, unless there are two sets of workmen—one digging holes, and the other lifting the plants. The requisite breadth and depth depends on the quantity and length of roots, but plenty of space should be allowed to spread them at full length, and to work readily all round. If the top soil is of better quality than that beneath, it may be placed on one side of the hole and mixed with some new, if the plant requires it. The bottom of the hole should be well broken up, and raised a little in the centre under the base of the plant. Having thus far prepared the hole, the plant may be placed in position, and the roots spread out evenly. It is best to ascertain first if the depth is all right, by laying a rod or drawing a small line across the top, taking a fair level on both sides. On no account should tree-trunks be buried, though they may be kept slightly lower than the ground level, in order that water may readily pass to the roots. A rod or line laid close to the trunk will show immediately if it is necessary to raise or lower the base, and any alteration can soon be made before filling in. Carefully spread out all the roots with the hand, and, should there be any hollow places beneath, fill in some soil to insure a firm resting-place. All soil that is placed in contact with the roots, both beneath and above, should be rather fine, and in a friable condition; this is very important, as hard lumps, or anything of too heavy a nature, would not fill up the cavities satisfactorily. Once the roots are arranged and covered, the holes may be filled up and trodden sufficiently, as the work proceeds,

**Transplanting**—*continued.*

to render the whole firm. All trees that are of sufficient height to be blown about and injured by rough winds, should be securely staked so soon as transplanted, or supported in some way, for preventing injury to the roots which would be caused were the trees allowed to sway about. In the case of standard or tall trees, transplanted for immediate effect, or for fruit-bearing, two or three guy ropes prevent this most effectually, and they may frequently be dispensed with so soon as the roots re-establish themselves. When lifting a tree for Transplanting, it is best to tie up with some soft cord any branches that may be near the base, and to commence digging out a spit of soil outside the line to which it is calculated the roots will reach. Then use a fork from the base of the tree outwards to separate the roots, but preserve as large a ball of earth as may be convenient to move, unless the tree is of a sort which transplants readily with bare roots. All roots which become mutilated had better be cut clean off before replanting; also any small ones, which sometimes die back—as, for instance, when trees have to be sent on a long journey. The necessity for watering depends very much on the season and the nature of the soil; if the subsoil is gravelly, a heavy watering would seldom do any harm, and water is the best of all substances for consolidating the top soil and roots. Watering is not so requisite in autumn as in spring Transplanting; but attention must be given to the subject throughout the summer immediately following. A mulching of loose litter or light manure, placed above the roots for a season, tends greatly to prevent evaporation, and to keep them moist even in dry weather.

The foregoing remarks are generally applicable to the Transplanting of any fruit and forest-trees, also all shrubs of moderate size that are amenable to the operation. The best seasons for performing the work, like other details, vary with individual subjects; some will transplant successfully at almost any season when carefully managed, while others are best moved at one particular period of the year. As a rule, all deciduous trees and shrubs transplant best in the autumn as soon as most of their leaves have fallen. These, and also Conifers and shrubs of all kinds, may generally be moved with safety any time during October, and up till the middle of November. There is then sufficient warmth in the soil to encourage the production of new roots before winter, and this is of great advantage. Transplanting may be proceeded with all through the winter whenever the weather is favourable; but the seasons when there is a certain amount of activity—as October and the early part of November, already mentioned—and a period immediately preceding the resumption of active growth in spring (February and March), are preferable. From the middle of November till the middle of January is the worst period for Transplanting, as vegetation is then so inactive, and the temperature of the ground very low. This period should not, therefore, be chosen by anyone who has but a moderate amount of the work to perform in any one season. Evergreen plants may be successfully moved later in the spring than deciduous ones, and Hollies transplant better in May, just as new growth begins, than at any other season. Rhododendrons may best be moved in March, or early in April. Such plants as half-hardy annualse, raised under glass for flowering in the open borders, are best transplanted into permanent positions before their flower-stems show; and hardy perennials which require division should be attended to in spring, before the annual growth is begun. Naturally, anything which is growing in a pot may be planted out in the open at periods when it would often be hazardous to attempt lifting the same individual from the ground. Transplanting in its entirety is therefore a subject the details of which have an extremely wide application;

**Transplanting**—*continued.*

the after-success will generally well repay for close attention to detail when performing the work. Briefly, the principal points are these: Lift the roots with the least possible injury, make the new holes sufficiently wide that all may be spread at full length; and, after regulating them with the hand, cover with soil that is in a good, workable condition. Avoid having any roots doubled underneath—when the tree is placed into its new position this must be guarded against—and secure the stem from rocking about with the wind afterwards. Give a copious watering soon after planting, or at a future period, according to the season and state of the soil, to consolidate all the earth which has been moved, and to supply moisture, of which the roots will be in special need, to enable them to re-establish themselves.

Transplanting of trees and shrubs of an unusual size is practicable by the use of mechanical means and plenty of strength. For filling up a blank in any important place, such as an avenue, or for planting with a view to producing an immediate effect, the work is sometimes undertaken, though, of course, under more or less exceptional circumstances. The trees must first be at hand, or be procurable within reasonable distance for removing, and they must be of a nature likely to transplant successfully with due care and previous preparation if necessary; they must also be situated where removal is practicable. With a view to safely Transplanting trees of a larger size than usual, a system of preparation one year in advance is advisable, particularly if the specimens are valuable. This consists in cutting a trench round the stem, at a distance which depends on the size of the ball which it is intended to move, and severing with a knife the large roots that reach thus far, making a clean cut. Previous to digging the trench, some new soil, of a light rather than heavy nature, should be prepared and brought alongside ready for use. Without allowing the roots to be long exposed, the trench should be filled up again with the fresh compost. In this, new feeders will usually push, during the following season, from the points which have been mutilated; and when the time for removing the tree arrives, the next trench requisite should be cut outside the one already referred to, and the young roots carefully preserved. Of course, cutting off the roots will effect a check on the vegetation and growth above ground. When there is a danger of the check being too great, the preparation is sometimes extended over two years, and only a half cut at one time. When this is practised, the circumference of the intended circular trench should be divided into about four equal parts, and two of these, opposite each other, dug out: the other two, which will also be opposite, may be left for treating similarly the next season. The principles which have been detailed in treating of the Transplanting of trees and plants of moderate size are similarly applicable, but on a larger scale, to those of unusual dimensions. If a ball of earth to be removed measures 2ft., 4ft., or 6ft. through, then the hole must be prepared so as to allow plenty of additional space for the roots to be spread out their full length. In starting to lift, it is best to begin wide, and allow sufficient room to work: the roots may be all the more readily separated from the soil and preserved from mutilation.

For Transplanting trees with a great weight of soil attached to their roots, different machines or tree-lifters are in use; the management of these invariably requires the closest attention on the part of every workman who assists, as well as the person in charge. Hence, this work, when mechanical power is necessary, should be executed only by those who understand the business from practical experience. Two of the best tree-lifting or Transplanting machines are those known respectively as Mr. McNab's and Mr. Barron's. The diameter of the ball is limited with Mr. McNab's to that of the inner part of the machine,





TRITELEIA UNIFLORA



**Transplanting—continued.**

which travels on two high wheels and is provided with handles for guiding it. There are double rollers before and behind; those furthest from the handles lift out, and allow of the machine being placed in position for lifting with the tree in the centre. The ball is reduced to the proper size, and bound round with a piece of strong canvas and cords; then two strong boards, which belong to the machine, are placed just underneath at the bottom, and ropes are passed under their ends at right angles, and brought up to the rollers of the machine. When everything is ready, the plant is wound up sufficiently high for travelling by means of four cross-shaped, iron



FIG. 88. BARRON'S TRANSPLANTING MACHINE.

levers or handles, which fit, at the point of intersection, on the ends of two of the rollers. One of the disadvantages in the use of this machine is the liability of the soil to fall out from the bottom of the ball, but this largely depends on the kind of soil and its tenacity, and also on the amount of roots which the plant possesses. The boards are also sometimes liable to shift from their proper places beneath, and allow the plant to fall through; but this is not a very frequent occurrence. These are but some of the risks that must be encountered if Transplanting machines are used; they only happen occasionally if the balls are firm, and everything is properly adjusted.

**Transplanting—continued.**

Mr. Barron's Transplanting machine (see Fig. 88) is capable of moving very large trees and masses of earth; it is, as may be imagined, very strongly constructed, and travels with the tree in an upright position. The weight is borne by two very strong rollers, whose ends rest on beams about 20ft. in length, that pass from the front to the back part of the machine, one on each side. There are four wheels, which stand rather high, to allow of the ball of earth being suspended beneath the beams, but above the ground line, for travelling. Two strong planks are placed through beneath the ball, as near as can be under the centre, to which are attached the lifting ropes

or chains, and cross planks are also placed above these, to make sure of bringing the mass up together. When all is in readiness, the rollers are very gently turned by means of straight, steel, lever bars, and a snatch catches in oogs on each roller, and prevents it from running back. Whether ropes or chains are used for lifting, they must be of great strength, as a serious accident might be the result at any minute were anything to break. If the ground over which the wheels are to pass, when loaded with a tree, is not very firm, it is necessary to use planks 3in. thick for forming a roadway. When the tree reaches its destination, it has to be brought over the hole, which should by that time be in readiness, and lowered into position by having the process of lifting reversed. This requires, if anything, even greater care than lifting, as there is more danger of a great weight overcoming the workmen when they are lowering than when they are raising it.

The whole details of working any Transplanting machine are beyond what can be properly described on paper so as to be understood; the operation can only be learnt from persons who understand the matter and have a machine before them, and by practical experience. The latter is in this case, as in most others, the best teacher; and it becomes necessary that anyone who undertakes the removal of large trees should have had such experience, not only for performing the work

successfully, but also because the operation is one which, if improperly executed, endangers the lives of workmen employed, apart from accidents to which they may be subjected in the event of any unavoidable mishap.

**TRAPA** (abridged from *calcitrapa*, the Latin name of an instrument called Caltrops, furnished with four spines, formerly used in war to impede the progress of cavalry). Water Caltrops. ORD. *Onagrarieæ*. A small genus (about three species) of curious, stove or hardy, floating herbs, inhabiting Central and Southern Europe,

**Trapa**—continued.

and tropical and sub-tropical Asia and Africa. Flowers axillary, solitary, peduncled; calyx tube short, the limb four-parted, two or all the segments persistent and becoming spinescent on the fruit; petals four, white, small; stamens four. Fruit bony, one-celled, large, obovoid, with four angles, indehiscent, with a short, cylindric beak at the top. Leaves dimorphic; submerged ones opposite, root-like, pinnatipartite, with filiform segments; floating ones rosulate, rhomboidal, the petioles having a spongy dilatation near the apex. The large seeds of *T. bispinosa* are sweet and edible; in Cashmere, and other parts of the East, they are common food, and are known under the name of Singhara Nuts. The species require a rich, loamy soil, and to be grown in a cistern, or a large pot or tub of water. Propagation may be effected by seeds.

**T. bispinosa** (two-spined). Singhara Nut-plant. *fr.* 3in. long and broad, glabrous or hairy; two opposite angles each with an often retrorsely scabrous spine, the other two angles sometimes obsolete. *l.*, floating ones 2in. by 2½in. to 3in., very villous beneath, the posterior margin entire, the anterior lightly crenate; petioles 4in. to 6in. long, woolly. India and Ceylon, 1822. Stove. Doubtfully distinct from *T. natans*.

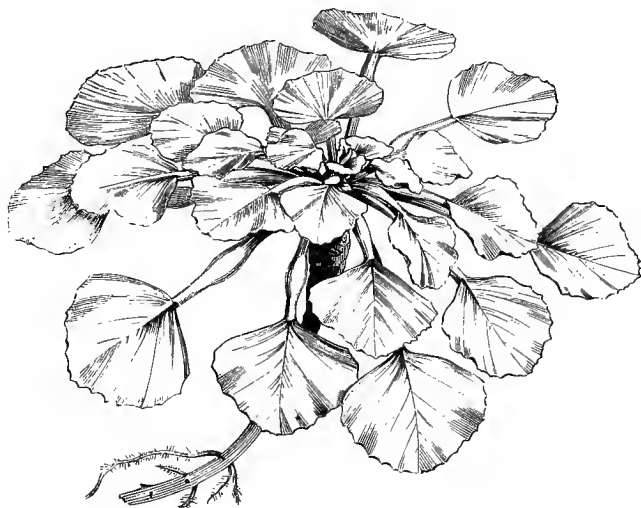


FIG. 89. UPPER PORTION OF PLANT OF *TRAPA NATANS*, showing Rosette of Floating Leaves.

**T. natans** (swimming).\* Jesuit's Nut; Ling; Water Caltraps; Water Chestnut. *fr.* 3in. broad, the four angles all spinescent, but the two lateral spines shorter. *l.*, floating ones 1in. long, toothed or incised-toothed on the anterior margin, sparingly villous on the nerves beneath; petioles 2in. to 4in. long,

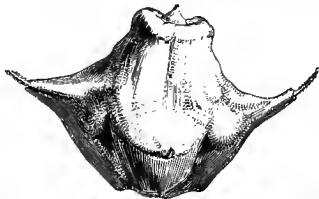


FIG. 90. FRUIT OF *TRAPA NATANS*.

glabrescent. Persia to Europe and the Upper Nile, 1781. Hardy. See Figs. 89 and 90. (B. R. 269; G. C. n. s., x., p. 212.)

**T. verbanensis** (Lago Maggiore)\* *fr.* trigonous, compressed, with two short horns. *l.* deltoid, the two upper sides dentate, with bimucronulate teeth. Lago Maggiore, 1886. Hardy. Whole plant glabrous.

**TRAPEZIFORM, TRAPEZOID.** Scarcely differing from rhomboid; having four sides, the opposite ones not parallel.

**TRAPS.** It is advisable to be provided with some of these in gardens, for the destruction of various kinds of vermin. The chief kinds of Traps required are those used for catching rats, mice, and moles. Rats may be caught by the ordinary kind of Trap used by keepers for rabbits, &c., if placed in their runs; but these destructive animals are more quickly disposed of by poisoning, if it can be safely practised, and sometimes by the aid of a gun. Mice are often destructive in seed-rooms and seed-beds, when the seed is of a kind which they like. An ordinary brick, and what is known as a Figure of 4 Trap, baited with a small piece of cheese, will generally catch them with certainty; also the small box Mousetraps commonly used in houses. For moles, the iron Traps with a spring and double claws, which clip the animal, from whichever side it proceeds, round the body, have generally superseded, and are preferable in gardens to, the old kinds made of wood and small wire. Traps, as they are generally called, may be formed in

various ways for particular purposes—as, for instance, to catch earwigs, which destroy the flower-buds of *Chrysanthemums*, *Dahlias*, &c. The best plan for trapping these is to put some dry material, such as hay or old beanstalks, into small flower-pots, and invert them on top of the stakes used for supporting the plants; or they may be placed amongst the branches. The earwigs conceal themselves in the pots, and, if these are examined occasionally, the insects may be shaken out and destroyed. A few small lettuce or tender cabbage leaves, also form, at times, an effectual Trap for slugs when these attack seedlings. Instead of retreating to their usual hiding-places, they will often shelter themselves under leaves purposely laid, and may easily be looked for and destroyed each morning. Cockroaches and beetles may be caught in large quantities by setting Traps in their haunts in the shape of open saucers or wide-necked bottles, partially filled with treacle, or any sweetened liquid. The Traps should be set so that the insects may enter them, but not get out again. Bottles partially filled with sweetened beer, or treacle, and suspended in vineries, often prove excellent Traps for catching large flies and wasps, which attack and eat the grapes.

**TRATTENIKIA.** A synonym of **Marshallia** (which see).

**TRAUTVETTERIA** (named in honour of Prof. Ernest Rud. Trautvetter, a Russian botanist of this century). ORD. *Ranunculacææ*. A monotypic genus. The species is a hardy perennial, thriving in ordinary soil. It may be propagated by divisions.

**T. palmata** (palmately-lobed). False Bugbane. *fl.* white, small, corymbose-paniculate; sepals three to five, usually four, concave, petal-like, very caducous; petals none. July and August. *l.* palmately lobed; radical ones large, the lobes toothed and cut; cauline ones few, alternate. Stems 2ft. to 3ft. high. North America and Japan. (B. M. 1630, under name of *Cimicifuga palmata*.) SYN. *Actæa palmata*.

**TRAVELLERS' JOY.** A common name for **Cle-matis Vitalba** (which see).

**TRAVELLERS' TREE.** A popular name for **Ravenala madagascariensis** (which see).

**TREASURE FLOWER.** A common name for **Gazania** (which see).

**TRECVLIA** (named in honour of M. Auguste Trécul, of Paris, author of a monograph on *Nuphar lutea*, in 1843). ORD. *Urticaceæ*. A small genus (two or three species) of stove, glabrous trees or shrubs, natives of tropical Africa. Flowers dioecious; heads sessile or shortly pedunculate, at the axils or the defoliated nodes; bracts under the head few, small, somewhat biseriate, but by no means forming a true involucre. Leaves alternate, shortly petiolate, entire, coriaceous, penniveined; stipules lanceolate, rather small, caducous. *T. africana*, the only species introduced, is an evergreen tree. It requires a compost of rich loam and leaf mould, and a moist atmosphere. Propagation may be effected by cutting of the ripened shoots, inserted in sandy loam, under a bell glass, with bottom heat.

**T. africana** (African). African Bread-fruit Tree; Okwa-tree. *fl.* green, in globose, shortly pedunculate heads. September. *fr.* in a head 1 ft. or more in diameter. *l.* alternate, very shortly petiolate, thickly coriaceous, 6 in. to 14 in. long, sometimes 7 in. to 8 in. broad, oblong-ovate or lanceolate, abruptly and obtusely acuminate, acute or often cordate at base; stipules 1 in. long, caducous. *h.* 60 ft. to 80 ft. 1872. (B. M. 5986.)

**TREE.** Any woody plant of perennial duration which rises from the ground with a distinct trunk.

**TREE FERN.** A common name for Ferns with an arborescent caudex: e.g., species of *Alsophila*, *Cyathea*, and *Dicksonia*.

**TREE-GUARDS.** These, in some form, are requisite for placing round all newly-planted trees in public streets, avenues, &c., where it is often necessary to provide some protection for the stem for several years. Besides protecting trees, the Guards act as an efficient support against injury from the wind after transplanting. The most substantial and best-formed, though rather expensive, Tree-guards, are those of circular shape, made of iron, the lower part, which is fixed into the ground, being wider in diameter than that which surrounds the tree stem higher up. A common form of Tree-guard consists of three upright wooden posts, placed in a triangular shape, and fixed with pieces of wood at an equal distance from each other at the top. The kind of Guard which causes least injury to the roots is, of course, preferable; the tree should always be tied at the top with cord, so that it cannot possibly come in contact with any part of the Guard and be injured. For protecting the bark of trees planted in streets from being cut by mischievous individuals, ordinary wire netting, of fine mesh, may be tied round the stems when the trees are first planted.

**TREE MALLOW.** See *Lavatera arborea*.

**TREE MIGNONETTE.** A title given to plants of Mignonette when grown singly to flower in large pots on tall stems as single specimens. Mignonette plants grown in tree form are interesting and ornamental subjects for conservatory decoration; but for general usefulness, five or six plants grown in each pot as dwarf specimens are most desirable. See *Mignonette*.

**TREE OF CHASTITY.** See *Vitex Agnuscastus*.

**TREE OF HEAVEN.** See *Ailantus*.

**TREE OF LIFE.** A common name for *Thuja* (which see).

**TREE OF SADNESS.** See *Nyctanthes Arbor-tristis*.

**TREE PANAX.** See *Dendropanax*.

**TREE SLUG.** See *Slugs*.

**TREFOIL.** See *Trifolium*.

**TREFOIL, BIRD'S-FOOT.** See *Lotus corniculatus*.

**TREFOIL, GOLDEN.** An old name for *Anemone Hepatica* (which see).

**TREFOIL, MILK.** An old name for the genus *Cytisus* (which see).

**TREFOIL, MOON.** A common name for *Medicago arborea* (which see).

**TREFOIL, SCENTED.** A common name for *Melilotus* (which see).

**TREFOIL, SHRUBBY.** A popular name for *Jasminum fruticans* and *Ptelea trifoliata* (which see).

**TREISIA.** Included under *Euphorbia*.

**TRELLIS.** A framework fixed in glass houses near the roof, on which to train plants and trees, such as Vines, Peaches and Nectarines, Cucumbers, and Melons, none of which could receive proper attention unless so treated. A Trellis may also be formed to fix into a large pot for the accommodation of an individual plant, as, for example, a *Stephanotis* or *Bougainvillea* grown for exhibition. Galvanised wire of different sizes is generally used, according to the different purposes for which it is intended. In Vineries and Peach-houses, the Trellis should be fixed, not less than 1 ft. from the glass, as it is always required; in Cucumber and Melon-houses, it may be in pieces, so as to be removed when the house is used for growing other plants which do not require a Trellis. The wires for training Vines upon should be fixed horizontally, 9 in. apart; and for Peaches and Nectarines 6 in. is preferable. When a Trellis is made in movable sections, the wires are usually crossed, to form a diamond-shaped pattern, and this allows of plants being tied and trained in any direction. Pyramid and balloon-shaped Trellises are those usually selected for specimen pot-plants.

**TREMANDRA** (from *tremo*, to tremble, and *anthos*, a male; the anthers vibrate with the least movement of the air). ORD. *Tremandree*. A genus comprising only a couple of small, greenhouse, more or less stellate-tomentose, Australian shrubs. Flowers five-parted; stamens apparently in a single series; disk crenate, almost five-lobed. Leaves opposite, toothed. For culture of the only species introduced, see *Tetratheca* (to which it is closely allied).

**T. stelligera** (star-bearing). *fl.* on pedicels shorter than the leaves; sepals tomentose or villous, two to three lines long; petals but little longer; anthers dark purple. Summer. *l.* opposite, shortly petiolate, ovate, obtuse, 1 in. to 1½ in. long, coarsely and irregularly toothed or rarely entire. *h.* 2 ft. or more. Plant densely stellate-hairy.

**T. verticillata** (whorled). A synonym of *Platytheca galioides*.

**TREMANDREE.** A small natural order of usually Heath-like, glabrous or glandular-hairy, extra-tropical Australian shrubs. Flowers usually red or purple, regular, solitary, on axillary pedicels; sepals four or five, very rarely three, free, valvate in bud; petals as many, hypogynous, spreading, induplicate-valvate in bud; stamens twice as many, hypogynous, free; filaments short; anthers two or four-celled, opening in a single, terminal pore; torus small, or rarely expanded into a disk between the petals and stamens. Capsule usually flattened, two-celled, opening loculicidally at the edges. Leaves small, alternate, opposite, or whorled, rarely larger and stellate-tomentose. The order contains three genera—*Platytheca*, *Tetratheca*, and *Tremandra*—and about twenty-one species.

**TREMANTHUS.** A synonym of *Styrax* (which see).

**TREMEX.** A genus of Sawflies, so closely related to *Sirex* (which see), and so similar in general appearance and habits, as to render a detailed account of the species unnecessary. This genus has not been met with in Great Britain; but one species (*T. Columba*), popularly known as the Pigeon Tremex, is destructive



**Tremex**—*continued.*

to the wood of Pear-trees, and also to Elms and Maples, in Canada and the United States, and may not improbably be introduced into Britain in trees from those countries. The female has the body about  $1\frac{1}{2}$  in. long, with the ovipositor extending nearly  $\frac{3}{4}$  in. backwards. The wings have a spread of about 2 in.; they are smoky-brown. The head and thorax are reddish-brown, with black markings; and the abdomen is black, with seven yellow cross-bars, each, except the first two, broken in the middle. The male is little more than half as large as the female, and the markings are less con-

**Trenching**—*continued.*

one end, and wheeled to the opposite end, where it is intended to finish. The depth which should be taken out varies according to the nature of the subsoil; if this is unfit to bring to the surface, it should be dug and still left beneath. Another width should then be marked out, and the top spit of soil turned over to take the place of that wheeled away, the bottom being, in its turn, treated like the first; and so on. When the soil is good enough to allow of the bottom spit being brought to take the place of the top, the first trench must be taken out to the full depth, and the bottom



FIG. 91. TREVESIA EMINENS

spicuous, the body being reddish, varied with black, and the wings more transparent.

Should this insect be accidentally imported, the measures to be employed against it are the same as those recommended under **Sirex**.

**TRENCHING.** A term applied to the process of digging ground for the special purpose of increasing its depth for the better cultivation of various crops. It is chiefly practised in autumn, and the surface thrown up roughly for exposure to the weather. In commencing to trench a piece of ground, the soil, for about the width of 3 ft., should be dug out a spit or more deep along

broken up. Trenching invariably deepens and improves garden land, but it is not always advisable to bring up the bottom soil at first; this is sometimes of a nature which causes actual harm to crops, and had better be left at the bottom below the limit which the roots reach. Trenching must, therefore, be practised with judgment. The bottom soil may always be loosened and dug, with advantage to that on the surface; and if some loose leaf mould or light manure is mixed into that beneath during the process, it will, in course of time, improve the whole bulk, and render it of a better description than before to a much greater depth.



**TRENTEPOHLIA.** Included under *Cyperus*.

**TREVESIA** (called after the family Treves de Bonfigli at Padua, who were supporters of botanical research). ORD. *Araliaceæ*. A genus embracing eight or nine species of prickly or unarmed, stove shrubs or small trees, inhabiting tropical Asia, Malaya, and the Pacific Islands. Flowers polygamous, in panicle umbels; petals eight to twelve, often cohering as a cap in the fertile flowers; stamens as many as the petals; pedicels not jointed; bracts small or wanting. Leaves ample, palmatifid, or digitately or pinnately compound. *T. eminens* and *T. palmata* require a mixture of sand, loam, and leaf mould. Cuttings will readily root in sand, under a glass, in heat.

**T. eminens** (eminent). *l.* long-stalked, roundish in outline, palmatifidly divided about two-thirds of their depth into nine lanceolate segments, which have each a prominent rib and both edges serrated, the teeth distinct, small, but sharp-pointed. Philippines, 1882. Probably a mere form of *T. palmata*. See Fig. 91 (for which we are indebted to Mr. Wm. Bull).

**T. palmata** (palmate-leaved). *fl.* greenish-white; panicles 1½ ft. long, straggling, clothed, when young, with red-brown tomentum. March. *l.* very large, sometimes 2 ft. long, palmate or digitate, nearly glabrous; segments lobed or sub-pinnatifid. Shoots covered with reddish hair and many prickles. *h.* 10 ft. to 15 ft. India, 1818. Tree. SYN. *T. sundaica*, *Gastonia palmata* (B. R. 894).

**T. sundaica** (Sunda Isles). A synonym of *T. palmata*.

**TREVIRANA.** A synonym of *Achimenes* (which see).

**TREVOA** (named in honour of Trevo, a Spanish botanist). ORD. *Rhamnææ*. A small genus (two or three species) of much-branched, greenhouse trees, natives of South America. Flowers fasciated below axillary spines; calyx four or five-lobed; petals four or five, hooded; stamens four or five, the filaments pilose; pedicels short, one-flowered. Leaves opposite, ovate or obovate, three-nerved, serrulated. *T. trinervis* has been introduced, but is now probably lost to cultivation.

**TREWIA** (named in honour of C. J. Trew, 1695-1769, of Nuremberg, a botanical author). SYN. *Rottlera* (of Willdenow). ORD. *Euphorbiaceæ*. A genus consisting of only two species of stove trees, often branched from the base, with soft wood, natives of the East Indies. Flowers dioecious, apetalous; disk none; male racemes lateral, opening before the leaves, long and loose, the flowers rather large, solitary, pedicellate, with a bract; female flowers solitary on an axillary peduncle or indefinitely racemose. Leaves opposite, petiolate, broad, entire, three to five-nerved. *T. nudiflora*, the only species introduced, succeeds in a compost of sandy loam and peat; it may be readily increased by cuttings, inserted in sand, under a glass, in heat.

**T. nudiflora** (naked-flowered). *fl.*, racemes axillary; males often exceeding the leaves, bearing flowers along nearly the whole of their length; females few-flowered. May. *l.* broadly ovate, acute or acuminate, cordate, obtuse or contracted-sub-cuneate at base, five-nerved, entire. Branchlets glabrous, or the young ones pubescent. *h.* 5 ft. and upwards. East Indies, 1796. (B. F. S. 281.)

**TRI.** This term, used in compounds, signifies three: e.g., *Tricuspidate*, three-cusped.

**TRIACHYRUM.** A synonym of *Sporobolus* (which see).

**TRIADELPHOUS.** When the stamens of a flower are disposed in three bundles.

**TRIADICA.** A synonym of *Sapium* (which see).

**TRIANDROUS.** Having three stamens.

**TRIANEA** (named in honour of M. José Triana, a botanist and traveller in Columbia). SYN. *Hydromystrica*, *Jalambicea*. ORD. *Hydrocharidææ*. A genus comprising three or four species of stove or greenhouse, stoloniferous, aquatic herbs, natives of North America, Mexico, and tropical South America, now regarded, by Bentham and

**Trianea**—continued.

Hooker, as synonymous with *Limnobia*. Spathe unisexual, two-leaved in both sexes; male flowers two or three in a spathe, long-pedunculate; females solitary in a spathe, sessile or shortly petiolate. Leaves fasciated at the nodes, petiolate, the blades swimming on the top of the water, ovate or rounded-cordate, sometimes (not always) of a thick, spongy substance below. Stems stoloniferous. *T. bogotensis*, the only species yet introduced, thrives in stove or greenhouse heat. Propagation is readily effected by runners.

**T. bogotensis** (Bogota). *fl.* small, six-parted; bracts hyaline, embracing the peduncles. *l.* clustered, oblong or orbicular, flat-convex, below spongy-reticulated; petioles dilated at base. Columbia, 1879. The correct name of this plant is *Limnobia bogotense*. (G. C. n. s., xv., pp. 466-468; R. G. 980.)

**TRIANTHEMA** (from *treis*, three, and *anthos*, a flower; alluding to a frequent disposition of the blossoms). ORD. *Ficoideæ*. A genus embracing about a dozen species of stove or greenhouse, diffuse, prostrate herbs, rarely sub-shrubs, inhabiting the warm regions of Asia, Africa, and Australia, and the West Indies. Flowers axillary, solitary, cymose or fasciated, sessile or pedunculate, rarely sub-spicate on the terminal branches; calyx lobes five; petals absent; stamens five or indefinite. Leaves opposite, unequal, petiolate, obovate, ovate, or linear, entire. Three species have been introduced, but they are interesting only to the botanist.

**TRIAS** (from *treis*, three; alluding to the arrangement of the floral envelopes). ORD. *Orchidææ*. This small genus embraces only three species of dwarf, tufted or creeping, stove Orchids; two are natives of Moulmein, and the other inhabits the East Indian peninsula. Sepals sub-equal, spreading, the lateral ones adnate at base with the foot of the column; petals small, oblong or linear; lip slightly spreading at apex, narrow, rather thick; scapes lateral, slender, leafless, one-flowered. Pseudo-bulbs rather small, sub-globose, one-leaved at apex. *T. oblonga*, probably the only species in cultivation, thrives best in an intermediate house, in small pans of peat and sphagnum, or on blocks with a little peat and sphagnum fastened amongst the roots.

**T. oblonga** (oblong-leaved). *fl.* fuscous-green, with a purplish lip; scapes erect, much shorter than the leaves. April. *l.* small, oblong, acute, coriaceous. *h.* 3 in. Moulmein, 1837.



FIG. 92. FLOWERING BRANCH OF *TRIBULUS TERRESTRIS*.

**TRIBLEMMA.** Included under *Asplenium*.

**TRIBRACHIUM.** A synonym of *Bulbophyllum* (which see).

**TRIBULUS** (*Tribolos* was the old Greek name used by Theophrastus, from *treis*, three, and *bolos*, a point; each carpel is often armed with three or four large spines). *Caltrops*. ORD. *Zygophyllaceæ*. A genus comprising about fifteen species of loosely-branched, stove, greenhouse, or hardy herbs, dispersed over the warmer regions of the globe. Flowers white or yellow, solitary, pseudo-axillary, pedunculate. Leaves stipulate, opposite, or by abortion alternate. Most of these plants, several of which have been introduced, are weedy-looking subjects, and interesting only to a botanist. *T. terrestris*, a South European plant, is shown at Fig. 92.

**TRICERIAIA.** A synonym of *Turpinia* (which see).

**TRICHETA.** Included under *Trisetum* (which see).

**TRICHANTHA** (from *thrix*, *trichos*, a hair, and *anthos*, a blossom; alluding to the slender pedicels). ORD. *Gesneraceæ*. A genus of two species of stove, creeping or climbing shrubs, natives of Columbia. Flowers solitary or fasciated in the axils, pedicellate, ebracteate; calyx free, coloured, ciliated-plumose, five-parted; corolla dingy violet, the limb and tube striped or angled with five longitudinal, yellow marks; limb loosely oblique, of five short, equal lobes. Leaves opposite, very different, one being ovate or oblong and acuminate, and the other dwarf. *T. minor*, the only species known in gardens, thrives in well-drained pots of peat, leaf mould, and sand, and is readily increased by means of cuttings, inserted in pots of sandy soil, and plunged in bottom heat.

**T. minor** (Lesser). *fl.*, corolla 2in. long, tubular, sub-ventricose, crinite-hairy, constricted above the base; limb obliquely four-lobed, the upper lobe bifid, with a club-shaped appendage; peduncles one-flowered. *l.*, the large one shortly petiolate, ovate, acuminate, entire, hairy beneath, slightly succulent. Stem climbing, radicant, adpressedly pilose or glabrous. 1864. (B. M. 5428; G. C. 1864, p. 172.)

**TRICHARIS.** A synonym of *Dipcadi* (which see).

**TRICHILIA** (from *tricha*, by threes; and the ovary and capsule are usually trilobular). ORD. *Meliaceæ*. A genus comprising about thirty species of stove trees and shrubs, natives of tropical Africa and America. Flowers rather large for the order, disposed in axillary, many-flowered panicles; calyx four or five-toothed or cleft; petals four or five, imbricated; staminal tube eight to ten-cleft or parted, rarely entire. Leaves trifoliate or imparipinnate; leaflets opposite or alternate, often many-jugate, very rarely bijugate. A selection of the introduced species is here given. They are not much grown, and rarely flower in this country. A compost of loam and peat is most suitable. Propagation may be effected by cuttings of the ripened wood, with the leaves intact, inserted in sand, under a glass, in heat.

**T. glabra** (smooth). A synonym of *T. havanensis*.

**T. havanensis** (Havana). *fl.* white, long-pedicellate, densely crowded in very short, umbelliform panicles. June. *l.* shortly petiolate, three-jugate; leaflets sessile, opposite, obovate, cuneate at base, rounded or obtuse, sometimes slightly acuminate, at apex, firm, opaque, somewhat shining. *h.* 20ft. Havana, 1794. Shrub or tree. SYN. *T. glabra*.

**T. hirta** (hairy). Bastard Ironwood. *fl.* whitish; panicles puberulous, two to four times exceeded by the leaves. June. *l.*, leaflets five-jugal, variable, elliptic or oblong-lanceolate, tapering to the base, glabrous, the lower ones smaller. *h.* 12ft. West Indies, 1800. Tree.

**T. odorata** (fragrant). *fl.* yellowish, sweet-scented; pedicels much longer than the flowers; cymes glabrous, many-flowered. June. *l.*, leaflets five-jugal, elliptic or oblong, 2in. to 6in. long; petioles naked. *h.* 12ft. to 25ft. West Indies, 1801. A low tree or shrub. (A. B. R. 637; H. E. F. 128.)

**T. spondioides** (Spondias-like). White Butterwood. *fl.* of a greenish-yellow colour; panicles puberulous, one-fourth the

*Trichilia*—continued.

length of the leaves, the divisions three to eleven-flowered. June. *l.*, leaflets seven to ten-jugal, ovate-oblong, oblique at base, acute at apex, glabrous, the lower ones smaller. *h.* 15ft. to 20ft. Tropical America, 1870. Tree. (Ref. B. 235.)

**TRICHINIUM** (from *trichinos*, covered with hairs; alluding to the shaggy appearance of the blossoms). ORD. *Amarantaceæ*. A genus comprising about fifty species of greenhouse herbs, under-shrubs, or rarely small shrubs, limited to Australia. Flowers in dense, globular, ovoid, or cylindrical spikes, very rarely elongated and interrupted; perianth usually pink or straw-colour, with a short, hard tube and five hairy segments; stamens five, but usually one, two, or three, without anthers. Leaves alternate, narrow or rarely obovate. Only three species have been introduced. They are all perennials, and thrive under cool greenhouse treatment, in any rich soil. Loam, rotten manure, and sand, make a suitable compost. The plants do best on an airy shelf, in full sunlight, and should be watered freely during the growing season. After flowering, water should be almost entirely withheld. Propagation is readily effected by means of the thick roots, which should be cut into pieces about lin. long, and inserted in sand, in bottom heat.

**T. alopecuroides** (Fox-tail Grass-like). A synonym of *T. exaltatum*.

**T. exaltatum** (exalted). *fl.*, perianth about 3in. in diameter, the segments yellow, with dull red tips; spikes erect, on long peduncles, at length oblong-cylindrical, about 2 1/2 in. in diameter. June. *l.*, radical and lower ones oblong-lanceolate, 3in. to 5in. long, contracted into long petioles; upper ones small, sessile. *h.* 2ft. to 3ft. 1838. A stout plant. (B. R. 1839, 28, under name of *T. alopecuroides*.)

**T. Manglesii** (Mangles)\*. *fl.*, perianth 3in. to lin. long, the segments with pink or whitish tips; spikes globular or ovoid, about 2in. in diameter, the coloured tips of the perianth protruding from the long, white hairs. June. *l.*, radical ones long-petiolate, varying from ovate to linear, obtuse or acute, lin. to 3in. long; cauline ones few, narrow, very acute. Stems decumbent, ascending, or rarely erect, 6in. to 12in. long. 1838. (B. M. 5448; F. d. S. 2396; G. C. 1864, p. 555; I. H. 464; R. H. 1866, p. 281.)

**T. Stirlingii** (Stirling's). *fl.*, perianth scarcely 3in. long, the segments plumose, with pink tips; spikes globular, solitary at the ends of the stems or loosely paniculate, 3in. to lin. in diameter. June. *l.* lanceolate, oblong, or almost linear; lower ones obtuse, shortly petiolate; upper ones small, more acute, sessile. Stems long, procumbent or ascending, and (as well as the leaves) clothed with white hairs. 1838.

**TRICHOCARPA.** Included under *Deparia* (which see).

**TRICHOCAULON** (from *thrix*, *trichos*, a hair, and *caulon*, a stem; alluding to the bristles that tip each tubercle). ORD. *Asclepiadææ*. A small genus (two species) of dwarf-growing succulents, natives of South Africa. Flowers small, proceeding from the angles near the upper part of the stem, sub-solitary; calyx five-partite, the segments acuminate; corolla deeply five-lobed; outer corona deeply bilobed. Leaves none. Stems dwarf, stout, fleshy, many-angled; angles tuberculate; tubercles tipped with a bristle. For culture, see *Stapelia*.

**T. piliferum** (bristle-bearing). *fl.* 3in. to 3 1/2 in. in diameter, sessile in the furrows of the stem; corolla between funnel and bell-shape, pale yellow-red without, dark purple within. Branches tufted, straight, cylindric, simple, erect, proceeding from a short, stout rootstock. 1832. (B. M. 6759.) SYN. *Piarranthus piliferus*, *Stapelia pilifera*.

**TRICHOCENTRUM** (from *thrix*, *trichos*, a hair, and *kentron*, a spur; alluding to the long, thin spur of the labellum). ORD. *Orchidææ*. A genus including about fourteen species of stove, epiphytal Orchids, natives of tropical America. Flowers mediocre or rather large; sepals and petals sub-equal, free, spreading; lip at base connate with the column, forming a pitcher, produced into a descending spur, above the pitcher erect, biauriculate or naked; lateral lobes scarcely dilated, nearly erect; column short, thick; pollen masses two, ovoid; scapes short, many-sheathed, one or rarely two-flowered. Leaves coriaceous. Stems very short, one-leaved, at length thickened into a small, fleshy pseudo-bulb. The

**Trichocentrum**—continued.

species thrive best in an intermediate temperature, in a moist, shady position, attached to blocks of soft wood or pieces of tree-fern stem. Water must be given all the year round, but care must be taken to prevent the roots being in contact with stagnant moisture. Propagation may be effected by division.

**T. albo-purpureum** (white-and-purple).\* *f.* large, freely produced; sepals and petals bright cinnamon-brown outside, tawny-yellow inside; lip white, with two large, purple spots near the base, the disk veined with rosy-purple, passing to yellow, and having a crest of four rosy-purple keels. *l.* sessile, oblong, acute, shining green, 4 in. to 6 in. long. Brazil, 1866. (B. M. 5638; G. C. 1866, 219; W. O. A. 204.)

**T. capistratum** (haltered). *f.* one to a peduncle; sepals and petals yellow; lip white, dotted and blotched with purple, remarkable for having its base extended into five short spurs. *l.* oblong-lanceolate, purplish. Costa Rica, 1871.

**T. cornucopiae** (cornucopia). A small plant, with yellowish-white flowers, having more botanical than horticultural interest. Rio Negro (?), 1866. (Ref. B. 77; R. X. O. 177.)

**T. fuscum** (fuscous). *f.* on short peduncles; sepals and petals purplish-green, spreading; lip much longer than the petals, cuneate, waved, with a slender spur at base, two-lobed at apex, lower down blotched with rose-colour and spotted with red. *l.* oblong, acute, spreading, somewhat twisted, purplish-green, minutely dotted. Mexico, 1841. (B. M. 3969; B. R. 1951.)

**T. f. Krameri** (Kramer's). A large-flowered variety, with a longer and thinner spur than in the type. Brazil, 1865.

**T. Hoegi** (Hoegi's). *f.* very large, borne on a zigzag peduncle; sepals and petals greenish-yellow, with a purple middle area; lip white, with brilliant purple lines and blotches, and two blunt, yellow calli at the base, pandurate, undulated, notched at the tip; spur with a clavate, notched apex. *l.* robust, horny, cuneate-oblong, acute. Mexico, 1882. A small but distinct plant.

**T. ionophthalmum** (violet-eyed). *f.* upper sepal and petals very light yellowish-maroon-brown, with brown dots at top, unguiculate, blunt; lateral sepals wholly brown; lip whitish, with a large, violet blotch on each basilar angle, pandurate. *l.* broader and shorter than those of *T. albo-purpureum* (which this plant resembles). Amazons, 1876.

**T. maculatum** (spotted). *f.* large; petals white, spotted with purple, oblong, obtuse; lip with a yellow crest, obovate, bilobed, very obtuse; spur very long. February. *l.* very thick, fleshy, linear-oblong, obtuse, spotted with red. Sierra Nevada, 1844.

**T. orthoplectron** (straight-spurred).\* *f.* large; sepals and petals light cinnamon-brown, tipped with yellow, cuneate-oblong; lip white, with a crimson-lake blotch on each side of the base, and five bars or semi-abortive keels of the same colour between the blotches, the disk in front of the crest being yellow; spur tapering to an acute point. October. Brazil. A curious and beautiful epiphyte. (W. O. A. 272.)

**T. Pavii** (Pavii's).\* *f.* in pairs on a raceme, as large as those of *Oncidium Gardneri*; sepals and petals half brown, half white, spatulate, obtuse; lip white, with a red blotch in the middle of its stalk, cuneate-lanceolate, bilobed, crisped. Central America, 1881. (G. C. n. s., xvii. 117; I. H. ser. iii. 587; R. G. 1103.)

**T. P. zonale** (zonal). *f.* sepals and petals entirely brown at their base, or the brown broken up into blotches, obtuse or acute; lip having one large, purple blotch or two darker ones before its base. 1883. An interesting and variable form.

**T. porphyrio** (porphyry-like). *f.* solitary, about 2 in. in diameter; sepals and petals brown, unequally margined and tipped with yellow, cuneate-oblong, acute; lip rich magenta-purple, faintly margined with white towards the point and having a rectangular, sulphur-yellow blotch on the disk in front of the three purple lines of the crest. *l.* cuneate-oblong. South America, 1884. A very handsome species. (I. H. ser. iii. 508.)

**T. pulchrum** (pretty). *f.* yellow and white; sepals much spreading, oval-elliptic; lip erect, obovate, cuneate at base, emarginate at apex. July. *l.* two or three, thickened at base, oblong, obtuse or acute, sometimes mucronate. Peru.

**T. purpureum** (purple). *f.* sepals and petals of a dull olive-green; lip purple, obovate-oblong, emarginate; spur thick, curved; scapes small, radical, one or two-flowered. Demerara.

**T. tenuiflorum** (slender-flowered). *f.* dingy brown and white, small; sepals and petals narrow, the former acute, the latter obtuse; lip linear-obovate, with a pair of plates occupying the whole of the base. Bahia.

**T. tigrinum** (tiger-striped).\* *f.* one or two to a peduncle; sepals and petals greenish-yellow, transversely barred and distinctly spotted with purplish-brown; lip pure white, 1½ in. long, nearly 2 in. across the dilated apex, with a yellow crest on the disk, and on each side at the base a wedge-shaped blotch of purple. *l.* oblong, more or less dotted with deep red. Ecuador, 1869. A remarkably handsome and desirable species, producing its blossoms while in a very small state. (I. H. ser. iii. 282.)

**T. t. splendens** (splendid). A fine variety, having the base of the large, obovate lip of a rich purple colour. 1886.

**TRICHOCEPHALUS**. Included under **Phylla** (which see).

**TRICHOCEROS** (from *thrix*, *trichos*, a hair, and *keras*, a horn; alluding to the two hairy, antenna-like processes from the column). ORD. *Orchideæ*. A small genus (six or seven species, which may be reduced to three or four) of stove, epiphytal Orchids, natives of Peru and Columbia. Flowers loosely racemose at the apices of the peduncles, mediocre or small, rather long-pedicellate; sepals sub-equal, free, and spreading, larger than the petals; lip sessile at the base of the column, spreading; pollen masses four; bracts shorter than the pedicels. Leaves few, distichous, coriaceous or fleshy. *T. parviflorus*, the only species yet introduced, thrives in small pans or baskets of peat and sphagnum.

**T. parviflorus** (small-flowered). *f.* green, marked with purple and brown spots and bars, small; lip three-parted, minutely ciliate; peduncle slender, nearly terete, axillary. Pseudo-bulbs small, bearing a single, fleshy leaf. Columbia, 1870. (R. X. O. i. 9.)

**TRICHODESMA** (from *thrix*, *trichos*, a hair, and *desmos*, a bond; the anthers are bound to each other by hairs). SYNS. *Borraginoides*, *Friedrichsthalia*, *Leiocarya*, *Pollichia*, *Spiroconus*, *Streblanthera*. ORD. *Boraginæ*. A genus comprising nine or ten species of coarse, hardy or half-hardy herbs, inhabiting Africa, tropical and Central Asia, and Australia. Flowers in terminal racemes; calyx deeply five-cleft; corolla of five often long-acuminate lobes; stamens five; anthers connivent by means of hairs. Leaves opposite or alternate, entire. *T. zeylanicum*, the only species known to cultivation, is a coarse, hardy annual, thriving under ordinary treatment.

**T. zeylanicum** (Cingalese). Ceylon Borage. *f.* pale blue, in simple racemes; calyx segments ½ in. to ¾ in. long; corolla lobes broad, longer than the calyx. *l.* linear to oblong-lanceolate, often 3 in. to 4 in. long, the margins usually recurved. *h.* several feet. Southern India, Ceylon, Mascarene Islands, and Australia. (B. M. 4820.)

**TRICHODIUM**. This genus is now included under *Agrostis*.

**TRICHOGLOTTIS** (from *thrix*, *trichos*, hair, and *glottis*, a tongue; alluding to the fine hairs on the labellum). ORD. *Orchideæ*. A small genus (four or five species) of inconspicuous, stove Orchids, mostly natives of the Malayan Archipelago. Flowers small or mediocre, one or a few on very short, lateral peduncles; sepals spreading, the lateral ones very broad, adnate to the foot of the column, the dorsal one and petals oblong; lateral lobes of lip short, erect, the middle one rather broad; column short, wingless. Leaves distichous, scattered at the sides of the stem, narrow. Stem leafy, elongated, not pseudo-bulbous. The species mentioned below thrive in small pans of peat and sphagnum, in the East India house, and require an abundant supply of moisture when growing.

**T. cochlearis** (spoon-like). *f.* white, with purple bars on both sides of the sepals and petals, smaller than those of *Saccolabium violaceum*; spur conical; lip spoon-like, very thick, with a few purple blotches; inflorescence very short, zigzag, four-flowered. *l.* like those of *Sarcanthus rostratus*, but thicker, and with a quite unequal point on one side projecting much farther than the other one. *h.* 8 in. Sumatra, 1883.

**T. fasciata** (banded).\* *f.* sepals and petals cuneate-oblong, acute, the lateral sepals falcate; sepals closely cross-banded with pale chestnut-brown; lip whitish, with yellow tips to the side plates of the anterior part and a few purplish spots on the keel of the under side. *l.* distichous, oblong, bilobed. Eastern tropical Asia, 1872. (W. O. A. 208.)

**TRICHOLENA**. Included under *Panicum*.

**TRICHOMANES** (the old Greek name used by Theophrastus, from *thrix*, *trichos*, a hair, and *manos*, soft; alluding to the delicate nature of the fronds). Bristle Fern. Including *Feea*, *Hymenostachys*, *Involucraria*, *Lacostea*, *Lecanium*, *Microgonium*, *Phlebophyllum*. ORD. *Filices*. A genus comprising about 100 species of mostly stove Ferns, inhabiting tropical and temperate climates. Fronds varying from simple to decomposed-multifid,

**Trichomanes**—continued.

membranous and pellucid, smooth or bearing simple, forked, or stellate hairs. Sori marginal, always terminating a vein, more or less sunk in the frond; involucre monophyllous, tubular, closely corresponding with the frond in texture, the mouth truncate or winged, or slightly two-lipped; receptacle filiform, elongated, often considerably exserted beyond the mouth of the involucre, capsuliferous principally at the base; capsules sessile, depressed, surrounded by an entire, broad, nearly transverse ring, bursting vertically. The introduced species are here described; except where otherwise stated, they need stove heat. They should be "grown in square, shallow pans and boxes, well-drained in the ordinary way, and having about 2in. of peat soil mixed with nearly half its bulk of sand and small broken potsherds; but soft sandstone is best. For the creeping sorts, the soil should be raised in the form of a mound; and for those that have long-extending rhizomes, if soft stone cannot be had, it is desirable to invert a pan or common deep pot, covering it with a layer of soil, as already explained, to which the plant will cling, and soon form a green hillock. Junks of wood answer the purpose, but in a moist, close, and warm atmosphere, Fungi and insects breed, and in a short time the wood decays, causing unnecessary disturbance of the whole mass of the plant" (J. Smith). See also **Ferns**.

**T. achillesefolium** (Achillea-fronded). A synonym of *T. rigidum*.

**T. alatum** (winged).\* *sti.* tufted, 2in. to 4in. long, winged above. *fronds* 3in. to 12in. long, lin. to 4in. broad, lanceolate or ovate-lanceolate, bi-tripinnatifid; main rachis winged throughout; pinnae lanceolate, acute, cut more than half-way to the rachis; lobes again often sharply toothed. *sori* two to twelve to a pinna, terminal on the segments, the mouth spreading. West Indies, 1824. Very variable in robustness and hairiness. SYN. *T. attenuatum* (H. S. F. i. 39c).

**T. anceps** (double). A synonym of *T. maximum*.

**T. angustatum** (narrowed). A synonym of *T. tenerum*.

**T. apilfolium** (Apium-fronded).\* *sti.* tufted, 4in. to 6in. long, strong, erect, fibrillose, the tuft densely so at the crown. *fronds* 9in. to 18in. long, 4in. to 8in. broad, ovate, quadripinnatifid; main rachis only slightly winged towards the apex; lower pinnae 4in. to 6in. long, lin. to 1½in. broad, lanceolate, acuminate; pinnules with numerous segments, which are again cut down into ultimate divisions about one line long. *sori* two to twelve to a pinnule; involucre short, turbinate. Philippine Islands, &c. SYN. *T. meifolium*.

**T. attenuatum** (attenuated). A synonym of *T. alatum*.

**T. auriculatum** (eared). *rhiz.* strong, wide-creeping, tomentose. *fronds* nearly sessile, 6in. to 12in. long, 1½in. to 2in. broad, bipinnatifid; rachis wiry, very slightly winged throughout or above only; pinnae short-stalked, ovate, rhomboidal, obliquely cuneate at base, irregularly pinnatifid half-way down or more, the lowest anterior lobes often considerably prolonged beyond the others. *sori* two to twelve to a pinna, the mouth truncate. Japan, &c., 1871. SYN. *T. dissectum*.

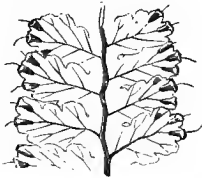


FIG. 93. PORTION OF FERTILE FROND (UNDER SIDE) OF TRICHOMANES BANCROFTII.

**T. Bancroftii** (Bancroft's).\* *sti.* lin. to 2in. long, broadly winged to the base. *fronds* 3in. to 6in. long, lin. broad, ovate-oblong, pinnatifid down to a broadly-winged rachis; segments oblong, blunt, crenate, either imbricated or with a small space between them. *sori* two to six to a pinna, the mouth rather dilated; receptacle long, filiform. Tropical America. See Fig. 93. (H. G. F. 56.)

**T. bipunctatum** (two-dotted). *rhiz.* wide-creeping, tomentose, rather slender. *sti.* lin. to 2in. long, naked slightly winged above. *fronds* oblong-lanceolate or oblong-deltoid, 2in. to 3in. long, about lin. broad, tripinnatifid, the rachis winged through-

**Trichomanes**—continued.

out; pinnae lanceolate, cut away on the lower side at the base; ultimate segments strap-shaped, lin. to ½in. long. *sori* one or more to a pinna; involucre winged. Mauritius. SYN. *T. Filicula*.

**T. Bojeri** (Bojer's). A synonym of *T. cuspidatum*.

**T. botryoides** (Botrys-like). *cau.* erect, tufted. *barren fronds* 2in. to 3in. long, lin. or rather more broad, on very short stipes, pinnatifid to a slightly-winged rachis, with linear-oblong, deeply-toothed lobes, the apex rooting and copiously proliferous. *fertile fronds* on stipes 1in. to 2in. long, narrow-linear, the apex foliaceous. *sori*, lower ones stalked, usually free; upper ones connected at the base. Tropical America. SYN. *Feea nana*.

**T. brevistum** (short-bristled). A synonym of *T. radicans*.

**T. concinnum** (neat). *rhiz.* filiform, tomentose. *sti.* three to four lines long, proliferous, winged upwards. *fronds* ovate, ½in. to 1in. long, rounded at top, cuneate at base, bipinnatifid; lower pinnae flabellately pinnatifid, the lowest pinnules bifid. *sori* usually lateral, rarely terminal; involucre immersed. Tahiti.

**T. crinitum** (hairy). *sti.* tufted, one to three lines long, slender, villous. *fronds* 2in. to 8in. long, ½in. to ¾in. broad, ovate-lanceolate or linear-oblong, bipinnatifid; pinnae reaching nearly to the rachis, the lower ones ovate-oblong, cut about half-way down into broadly linear segments; surface slightly hairy; margins ciliated. *sori* one or two to a pinna, terminal, the mouth dilated. West Indies.

**T. crispum** (curled). *rhiz.* short or somewhat elongated, strong, tomentose. *sti.* scattered or tufted, 2in. to 6in. long, strong, tomentose. *fronds* 4in. to 12in. long, 1½in. to 2in. broad, lanceolate, fully pinnate or pinnatifid nearly to the rachis; lower pinnae ½in. to 1in. long, oblong, obtuse, spreading, or even deflexed, often incurved and crisped; rachis clothed with reddish-brown hairs. *sori* one to eight placed round the apex of the pinnae, the mouth two-lipped; receptacle long, exserted. Tropical America, 1828.

**T. c. pilosum** (pilose). *fronds* clothed with reddish hairs. 1863.

**T. curvatum** (curved). A synonym of *T. javanicum*.

**T. cuspidatum** (cuspidate). *fronds* indistinctly but very shortly stalked, about ½in. broad, the outer edge rounded and more or less lobed, the base truncate or more or less cuneate. Involucres one to six, the tube sunk in the frond, the mouth dilated, but scarcely two-lipped. Mauritius. SYN. *T. Bojeri*.

**T. dissectum** (dissected). A synonym of *T. auriculatum*.

**T. elongatum** (lengthened). A variety of *T. rigidum*.

**T. erosum** (bitten). *rhiz.* thread-like. *sti.* filiform, ½in. to ¾in. long. *fronds* very variable in shape, lanceolate to semicircular, entire or repand-pinnatifid, lin. to 2in. long, abundantly veined. *sori* one or many placed along the upper margin of the frond; involucre immersed, cylindrical, with a large, collar-like limb. Seychelles. SYN. *T. muscoides*.

**T. exsectum** (scolloped). *rhiz.* wide-creeping, slender, tomentose. *sti.* slender, naked, lin. to 3in. long. *fronds* 6in. to 12in. long, lin. to 2in. broad, pendent, flaccid, lanceolate, tripinnatifid, the main rachis narrowly winged in the upper half; pinnae distant, flaccid, the upper ones often 3in. to 4in. long, the lower ones ovate or lanceolate, divided to a narrowly-winged rachis, with a few deeply-toothed or pinnatifid pinnules. *sori* one to four to a pinna, the mouth truncate. Chili.

**T. Filicula** (little Fern). A synonym of *T. bipunctatum*.

**T. fimbriatum** (fringed). A synonym of *T. superbum*.

**T. floribundum** (bundle-flowered). A synonym of *T. pinnatum*.

**T. gemmatum** (twin). *rhiz.* strong, wiry, tomentose, beset with numerous long, black fibres. *sti.* lin. to 3in. long, naked, wiry, winged above. *fronds* 2in. to 6in. long, lin. to 2in. broad, erect, rather rigid, ovate-oblong, bipinnatifid, the main rachis narrowly winged; pinnae erecto-patent, cut down to a narrowly-winged rachis; lower pinnules deeply forked; segments linear-filiform. *sori* one to eight to a pinna, minute, axillary, the tube stalked. South America.

**T. Hartii** (Dr. Hart's). *cau.* short, slender, sub-erect. *sti.* tufted, 2in. to 4in. long, winged in the upper part. *fronds* deltoid, 3in. to 6in. long, tripinnatifid, the main rachis distinctly winged; pinnae eight to twelve-jugate, crowded, sessile, all except the lowest lanceolate; lowest pair lanceolate, deltoid; ultimate segments oblong, obtuse, erecto-patent. *sori* usually only one to each secondary segment, except in the deeply-pinnatifid, large ones on the lower side of the lowest pair of pinnae. Sierra Leone, 1862.

**T. humile** (dwarf). *rhiz.* creeping, deeply intermatted. *sti.* ½in. to ¾in. long, slender, winged above. *fronds* lin. to 2in. long, ½in. broad, bipinnatifid, lanceolate-oblong, cut down to a narrowly-winged rachis; segments pinnatifid, with simple or once-forked, linear lobes. *sori* solitary on the upper side of the pinnae, the tube more or less exserted, the mouth two-lipped. Java, &c.

**T. incisum** (cut). A synonym of *T. sinuosum*.

**T. javanicum** (Javan). *cau.* tufted, with numerous strong, wiry roots. *sti.* lin. to 4in. long, wiry, erect, naked or villous. *fronds* 2in. to 8in. long, lin. to 2in. broad, ovate-lanceolate, acuminate, once fully pinnate; lower pinnae often 1in. long, ½in. broad, obtuse or acute, finely toothed. *sori* one to four, placed in the axils of linear segments on the upper side of the pinnae;

**Trichomanes**—continued.

receptacle much exserted. India, Java, &c. *SYNS.* *T. curvatum*, *T. rhomboideum*.

**T. Kaulfussii** (Kaulfuss'). *rhiz.* wide-creeping, strong, tomentose. *sti.* 2in. to 4in. long, strong, compressed, winged above. *fronds* 4in. to 12in. long, 1½in. to 2in. broad, ovate-lanceolate, acuminate, once-pinnatifid down to a broadly-winged rachis; segments linear-oblong, rounded or acute, toothed, the largest 1in. long, ½in. broad; main rachis densely, and the surface slightly, hairy. *sori* two to twelve to a pinna, the tube more or less exserted; receptacle long, filiform. West Indies, 1862.

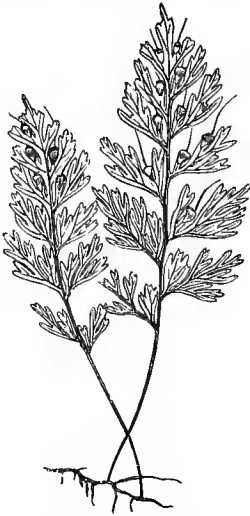


FIG. 94. TRICHOMANES KRAUSSII.

**T. Kraussii** (Krauss').\* *rhiz.* wide-creeping, tomentose. *fronds* sessile or nearly so, 1in. to 3in. long, ½in. broad, oblong, attenuated or cuneate at base, once deeply pinnatifid down to a broadly-winged rachis; lobes linear-oblong, nearly entire, or toothed or sinuate-pinnatifid. *sori* one to six on the apex of the frond, the tube more or less exserted, the mouth with two large lips. West Indies. See Fig. 94.

**T. labiatum** (lipped). *fronds* variable in shape, roundish and cordate at one or both ends, or sub-ovate and narrowed at base and apex, pellucid dark green; fertile ones with a distinct midrib. *sori* confined to the apex, usually one, rarely two to four; involucre tubular, free or slightly sunk, with tufts of hairs on the margined sides; lips large, expanded and rounded. British Guiana, 1885.

**T. Luschnatianum** (Luschnat's). A variety of *T. radicans*.

**T. maximum** (greatest).\* *rhiz.* stout, creeping. *sti.* strong, erect, 3in. to 6in. long. *fronds* 1ft. to 1½ft. long, 6in. to 9in. broad, ovate, quadripinnatifid; pinnae erecto-patent, ovate-lanceolate, the largest 4in. to 6in. long, 2in. broad; pinnules lanceolate-deltoid, 1in. or more long, cut down to the rachis into segments, which are again deeply pinnatifid; ultimate segments ½in. to ¾in. long. *sori* two to eight to a pinnule; involucre cylindrical, the mouth two-lipped. Java, 1863. *SYN.* *T. anceps* (H. S. F. i. 40c, 3).

**T. meifolium** (Spiguel-leaved). A synonym of *T. apifolium*.

**T. membranaceum** (membranous). *fronds* sub-sessile, membranous, sub-orbicular, 2in. to 3in. broad, more or less deeply cut from the circumference towards the centre; lobes broad, rounded, or narrow, the margin fringed with a double series of peltate scales. Involucres numerous, placed round the edge of the frond, the tube sunk, the mouth two-lipped. Tropical America. (H. E. F. 76.)

**T. muscoides** (Moss-like). A synonym of *T. erosum*.

**T. obscurum** (obscure). A synonym of *T. rigidum*.

**T. parvulum** (rather small). *rhiz.* wide-creeping, interlaced. *sti.* 1in. long, wiry, slender, tomentose below. *fronds* ½in. to ¾in. each way, orbicular, flabellately cut about half-way down from the outer edge towards the base into narrow, irregular segments. *sori* four to six, terminal on the central segments. Japan and China, &c. Greenhouse. (H. S. F. 39a.)

**T. Petersii** (Peters'). *sti.* one to two lines long. *fronds* ½in. to ¾in. long, linear to obovate-spathulate, crenate or slightly lobed. *sori* solitary, terminal, the tube sunk in the frond, the mouth much dilated, but entire. United States, 1875. Greenhouse.

**Trichomanes**—continued.

**T. pinnatinerva** (pinnate-nerved). *rhiz.* dark, tomentose, thread-like. *sti.* a quarter to one line long. *fronds* scattered, ovate, two to three and a half lines long, one to two lines broad, pellucid, clear, bright green. British Guiana, 1886. A very minute Filmy Fern.

**T. pinnatum** (pinnate). *cau.* erect, tufted. *sti.* strong, wiry, erect, naked or slightly hairy, 3in. to 12in. long. *fronds* simply pinnate in the typical state, 4in. to 18in. long, 3in. to 12in. broad, the apex often rooting and proliferous; pinnae in two to ten opposite or alternate pairs and a terminal one, 2in. to 6in. long, linear, obtuse or acute, sharply and finely toothed, the upper edge usually free from the stem at the base, the under one attached and often furnished with a broad, decurrent wing. *sori* placed all round the pinnae; receptacle long, exserted. Tropical America, 1825. *SYN.* *T. floribundum*.

**T. Plumia** (feathery). *rhiz.* short-creeping, clothed with bright brown scales. *sti.* 2in. to 4in. long, terete, wiry. *fronds* lanceolate, 4in. to 6in. long, 1in. to 1½in. broad, decomposed; rachis stiff, terete throughout; pinnae crowded, twenty to thirty-jugate, spreading, less than ½in. broad; lower pinnules sparsely pinnatifid, cut into distant, bristle-like, dichotomously-forked lobes, ½in. to ¾in. long. *sori* few, placed near the base of the upper pinnae; receptacle very long. Malay Isles.

**T. punctatum** (dotted). *fronds* stalked or sub-sessile, ½in. to 1in. broad, sub-orbicular or obovate, undulated or slightly lobed at the margin. *sori* one to four, placed on the outer edge of the frond and more or less exserted, the mouth distinctly two-lipped. Tropical America.

**T. pusillum** (dwarf). *rhiz.* wide-creeping, tomentose. *fronds* nearly sessile, 2in. to 3in. long, ½in. to 1in. broad, oblong or obovate, cuneate-attenuated below, once deeply pinnatifid down to a broadly-winged rachis; lobes linear or oblong, toothed or deeply pinnatifid. *sori* one to four round the apex of the frond, the tube exserted, the mouth with two large, rounded lobes. Tropical America. *SYN.* *T. quercifolium*.

**T. pyxidiferum** (box-bearing).\* *rhiz.* wide-creeping, tomentose, rather slender. *sti.* 1in. to 2in. long, naked, winged above. *fronds* 1in. to 6in. long, 1in. to 1½in. broad, ovate-oblong, tripinnatifid, the main rachis very narrowly winged, often free, except near the apex; lower pinnae 1in. to 4in. long, ovate-rhomboidal, cut down to a narrowly-winged rachis; pinnules again deeply pinnatifid; ultimate segments often emarginate at apex. *sori* one to four to a pinna, axillary, the tube more or less winged; receptacle filiform, exserted. Tropical America.

**T. quercifolium** (Oak-fronded). A synonym of *T. pusillum*.

**T. radicans** (rooting).\* Cup Goldilocks; Killarney Fern. *rhiz.* wiry, wide-creeping, tomentose. *sti.* strong, wiry, ascending, 2in. to 6in. long, naked or nearly so, the upper part sometimes winged. *fronds* 4in. to 12in. long, 2in. to 6in. broad, tripinnatifid, the main rachis very narrowly winged, often free, except near the apex; lower pinnae 1in. to 4in. long, ovate-rhomboidal, cut down to a narrowly-winged rachis; pinnules again deeply pinnatifid, ovate-rhomboidal, with deeply-toothed lower segments. *sori* lateral, one to four to a pinnule, the tube small, more or less exserted; receptacle slender, elongated. Europe (Britain). Hardy. *SYN.* *T. brevisetum*.

**T. r. Andrewsii** (Andrews'). *fronds* deep green, narrow-lanceolate; pinnae more distant than in the species, narrower and erect. A distinct and handsome, hardy, Irish variety.

**T. r. dilatatum** (dilated). *fronds* very dark green, much less divided than in the type; pinnae and pinnules broadly winged. Hardy.

**T. r. Luschnatianum** (Luschnat's). *fronds* lanceolate, acuminate, quite sessile. Brazil. Stove.

**T. reniforme** (kidney-shaped). *sti.* 4in. to 8in. long, naked, wiry. *fronds* orbicular-reniform, entire, with a deep sinus at the base, 2in. to 4in. broad. *sori* often encircling the whole of the outer margin; receptacle much exserted, stout, and covered with capsules. New Zealand. Greenhouse.

**T. reptans** (creeping). *sti.* ½in. long. *fronds* ½in. to ¾in. each way, obovate-cuneate, often with short, blunt lobes. *sori* one to four, placed on the outer margin, the tube partially or quite exserted, the mouth distinctly two-lipped. Tropical America. This is very closely allied to *T. punctatum*.

**T. rhomboideum** (rhomboid). A synonym of *T. javanicum*.

**T. rigidum** (rigid).\* *sti.* tufted, erect, wiry, 2in. to 8in. long, naked or very slightly winged above. *fronds* 2in. to 8in. long, 2in. to 6in. broad, deltoid or ovate, acuminate, tri- or quadripinnatifid, the main rachis usually only slightly winged towards the top; lower pinnae 2in. to 3in. long, erecto-patent, ovate or lanceolate-rhomboid, cut down to a rachis which is very narrowly winged throughout or free below; pinnules deeply pinnatifid, with deeply-toothed or even pinnatifid, linear lobes. *sori* two to twelve to a pinnule, small, axillary, the tube more or less exserted. New Zealand, &c. Stove or greenhouse. *SYNS.* *T. achillaeifolium*, *T. obscurum*.

**T. r. elongatum** (lengthened). *fronds* deltoid, with broader segments; pinnae and pinnules often imbricated.

**T. rufum** (reddish). *sti.* (and under side of the fronds) most profusely covered with long, rufous, woolly hairs. *fronds* pale green above, about 10in. long and 1½in. broad, pinnate; pinnae

**Trichomanes**—*continued*.

overlapping each other, the veins exserted at their tips. *Demerara*. A very rare, distinct, erect-growing Fern.

**T. saxatile** (rock-loving). *sti.* terete, hairy. *fronds* tufted, triangular-ovate, pinnate below; pinnae bipinnatifid, the upper ones decurrent; pinnules ovate, the margins more or less decurved, giving the surface a pretty, undulating character; ultimate segments broad, short, obtuse-pointed. Involucres cylindrical, supra-axillary, slightly two-lipped. Borneo, 1862. A dwarf but very pretty species.

**T. scandens** (climbing). *rhiz.* wiry, wide-creeping. *sti.* strong, erect, naked, 2in. to 4in. long. *fronds* 6in. to 18in. long, 3in. to 6in. broad, fully pinnate, or the hairy rachis very slightly winged above, ovate, acuminate; lower pinnae ovate-lanceolate, nearly pinnate, 2in. to 4in. long; pinnules divided down to a narrow wing; segments again pinnatifid about half-way down; margins finely hairy. *sori* one to four to a pinnule, the mouth with two lateral projections. Mexico, &c., 1862.

**T. Sellowianum** (Sellow's). *sti.* clothed with short hairs. *fronds* bright green, linear-lanceolate, deeply pinnatifid; segments oblong, obtuse, waved at the edges, where there are a few hairs. Brazil. An extremely rare plant in cultivation.

**T. setigerum** (bristle-bearing). *sti.* quite terete, 2in. to 6in. long, furnished with hair-like scales. *fronds* tufted, 9in. to 15in. long, linear or linear-lanceolate, pinnate, smooth, curving; pinnae bipinnatifid; pinnules palmate; ultimate segments elongated and very narrow, almost capillary, the lower ones incurved, sub-erect. Involucres supra-axillary, small, sub-cylindrical, terminal on a narrow segment. Borneo, 1862.

**T. sinuosum** (waved). *rhiz.* wide-creeping, sinuous, rather strong. *sti.* varying from hardly any to 2in. long. *fronds* 2in. to 9in. long, 1in. to 1½in. broad, linear-lanceolate, very gradually decurrent below, pinnatifid down to a broadly-winged rachis; lobes oblong, obtuse, crenate-margined. *sori* two to four to each lobe; receptacle much exserted. Tropical America. *SYN. T. incisum*.

**T. spicatum** (spicate). *cau.* erect, tufted. *barren fronds* 4in. to 6in. long, 1in. to 1½in. broad, on stipes 1in. to 2in. long, pinnatifid nearly to the rachis, the apex not rooting; segments inciso-crenate, linear-oblong. *fertile fronds* composed of a rachis and two rows of *sori*, without any connecting membrane. West Indies. (H. G. F. 60.) *SYN. Feea polypodioides*.

**T. superbum** (superb). *rhiz.* strong, wide-creeping. *sti.* 2in. to 5in. long, strong, winged nearly down to the base. *fronds* 4in. to 9in. long, 2in. to 4in. broad, broadly ovate, pinnatifid down to a narrowly-winged rachis; lower pinnae lanceolate, divided more than half way to the rachis, with oblong, crenate lobes. *sori* two to six to each lobe; receptacle long, filiform. Trinidad, 1863. *SYN. T. fimbriatum*.

**T. tenerum** (slender). *rhiz.* creeping, tomentose, very slender. *sti.* 1in. to 2in. long, slender, naked. *fronds* 3in. to 8in. long, 1in. to 1½in. broad, pendent, flaccid, lanceolate, tripinnatifid, the main rachis only very slightly winged towards the apex; pinnae distant, flaccid, cut down to a narrowly-winged rachis, with distant, deeply incised or pinnatifid pinnules; ultimate segments about two lines long. *sori* one to four to a pinna, the tube more or less exserted. Tropical America. *SYN. T. angustatum*.

**T. tricholideum** (hair-like).\* *rhiz.* creeping, slender. *sti.* 1in. to 2in. long, very slender, naked. *fronds* 4in. to 8in. long, 1in. to 2in. broad, pendent, flaccid, lanceolate, tripinnatifid, the main rachis only slightly winged at the apex; pinnae flaccid, 1in. to 2in. long, the rachis only winged above; pinnules deeply cut, with distant, linear-filiform segments one to two lines long. *sori* one to four to a pinna, the tube exserted, sometimes stalked. West Indies, 1862.

**T. trichophyllum** (hair-fronded). *sti.* densely tufted, wiry, terete, 1in. to 2in. long. *fronds* 2in. to 4in. long,

**Trichomanes**—*continued*.

1in. to 1½in. broad, oblong, decomposed; rachis stiff, terete throughout; pinnae twelve to fifteen-jugate, much imbricated, many of them deltoid, ½in. broad; lower pinnules copiously pinnatifid; ultimate divisions bristle-like, ½in. to 1in. long, spreading in all directions. *sori* copious, free, placed near the base of the pinnules on the upper side. Borneo and New Caledonia, 1862.

**T. venosum** (veined). *rhiz.* slender, wide-creeping. *sti.* 1in. to 2in. long, very slender, naked. *fronds* 2in. to 6in. long, 1in. to 1½in. broad, pinnatifid, the main veins free in the lower half, broadly winged above; lower pinnae about 6in. long, varying from linear and nearly simple to lanceolate and deeply pinnatifid below. *sori* only one to a pinna, axillary on the upper margin, the tube slightly two-lipped. Australia and New Zealand. Greenhouse.

**TRICHONEMA.** A synonym of *Romulea*.

**TRICHOPETALUM** (from *thrix*, *trichos*, a hair, and *petalon*, a petal; the inner perianth segments are fringed).

ORD. *Liliaceæ*. A monotypic genus. The species is a curious, half-hardy, perennial herb, with a thick rhizome, and fascicled, fleshy or tuberous root fibre. A light, rich soil is most suitable. The plant succeeds in a pit, or in an effectively-drained frame, with a southern aspect. It will also thrive in pots, if ample drainage be afforded. Propagation may be effected by divisions.



FIG. 95. TRICHOPILOIA SUAVIS.



**Trichopetalum**—continued.

**T. gracile** (slender). A synonym of *T. stellatum*.

**T. stellatum** (star-like). *fl.*, perianth greenish, six to seven line-long, the outer segments keeled, the inner ones densely bearded; pedicels ascending; raceme straight, rather loose, few-flowered, simple or slightly forked, 3in. to 6in. long; scape 6in. to 12in. long, with one to three bracts (reduced leaves). Early summer *l.* six to eight, narrow-linear, glabrous, Grass-like, 4in. to 12in. long. *h.* 1ft. to 5ft. Chili, 1828. *SYNS.* *T. gracile* (B. R. 1535), *Anthericum plumosum* (B. M. 3084). The correct name of this plant is *Bottionea thysanotoides*.

**TRICHOPIPHORUM.** Included under *Eriophorum*.

**TRICHOPHYLLUM.** A synonym of *Bahia* (which see).

**TRICHOPIILIA** (from *thrix*, trichos, a hair, and *pilion*, a cap; the anther is concealed below a cap surmounted by three tufts of hair). *SYNS.* *Leucophyle*, *Pilumna*. Including *Helcia*, *Oliveriana*. *ORD.* *Orchideæ*. A genus embracing about sixteen species of beautiful, greenhouse, epiphytall Orchids, inhabiting the warmer parts of America. Flowers showy, pedicellate; sepals sub-equal, free, narrow, erecto-patent, often twisted; petals similar; lip with the claw adnate to the column, which it closely invests above, the limb spreading, the slightly-dilated lateral lobes connivent, the middle one continuous and undulated; pollen masses two, ob-ovoid-oblong, exappendiculate; bracts small; scapes springing from a short rhizome, leafless, few-sheathed, one, two, or rarely three to five, flowered. Leaf fleshy, erect, complicated at base, narrow or rather broad. Pseudo-bulbs one-leaved. *Trichopilias* may be grown in pots, or in hanging baskets; in the latter their flowers are seen to the best advantage. The plants should be kept well elevated above the rim of the pots or baskets, in order that good drainage may be insured; the flower scapes also proceed from beneath the leaves and pseudo-bulbs. Fibrous peat and living sphagnum, with some pieces of charcoal intermixed, afford a suitable compost. A moderate supply of water should be given during the growing season, but very little is requisite in winter; still, the plants must not be allowed to suffer for want of it. *Trichopilias* in good health blossom very freely; the plants succeed best in the Mexican house. Sickly specimens—the result of growing in too high a temperature—are frequently met with. Propagated by carefully-made divisions.

**T. albida** (whitish). *fl.*, sepals and petals pale greenish-yellow, nearly straight, the margins slightly hyaline; lip longer than the petals, four-lobed; the lobes whitish, the throat with scattered, ochraceous-yellow dots; hood trilobed; raceme pendulous, about three-flowered. *l.* oblong-lanceolate, flat, sub-cordate at base, acuminate at apex, recurved. Caraccas, 1851.

**T. Backhousiana** (Backhouse's). *fl.* more fleshy than in *T. fragrans* (which this species closely resembles); lip much narrower and lobed near each end, but twice as broad in the middle as that of *T. fragrans*. *l.* faintly spotted and clouded with darker patches. New Grenada, 1875. Whole plant paler green than *T. fragrans*.

**T. coccinea** (scarlet). A garden synonym of *T. marginata*.

**T. crispa** (curled).\* *fl.*, sepals and petals light cherry-crimson, faintly edged with white, the margins crispate-crenate; lip white outside, somewhat deeper in colour than the sepals, large, the margin irregularly crisped, the throat rich deep

**Trichopilia**—continued.

crimson. April to June, Central America, 1857. A charming and rare species, resembling *T. marginata*.

**T. c. marginata** (margined). *fl.* large and very showy; sepals and petals pale purplish-red, white at the edges; lip white externally, the central lobe dull crimson, the throat of a darker and richer crimson, the limb narrowly edged with white. (F. d. S. 1925-6; W. S. O. i. 5.)

**T. fragrans** (fragrant).\* *fl.* deliciously sweet-scented; sepals and petals pale yellowish-green, 2½in. to 3in. long, wavy, and slightly twisted; lip pure white, orange-spotted towards the base; racemes pendent, three or four together. Winter.



FIG 96. FLOWER OF *TRICHOPIILIA SUAVIS* (natural size).

*l.* broadly oblong-lanceolate. Pseudo-bulbs oblong, 4in. to 6in. long, slightly compressed. New Grenada, 1858. *SYN.* *Pilumna fragrans* (B. M. 5035).

**T. fragrans** (fragrant). A garden synonym of *T. nobilis*.

**T. Galeottiana** (Galeotti's).\* *fl.*, sepals and petals cuneate-lanceolate, acute, the latter somewhat broader, pale green, with a central bar of olive-brown; lip closely folded round the column, the front lobe obreniform, the disk pale yellow, with bars and lines of crimson-purple, the margin passing to white; peduncles one-flowered. August and September. *l.* cuneate-oblong, acute, dark green. Pseudo-bulbs tall, ligulate, acipitous, Mexico, 1860. *SYNS.* *T. picta* (I. H. 225), *T. Turialvae*, of Bateman (B. M. 5550).

**T. grata** (pleasing). *fl.* sweetly-scented; sepals and petals yellowish-green; lip expanded, white, blotched with yellow on each side of the keel; racemes few-flowered. *l.* oblong-ligulate. Pseudo-bulbs elongated, acipitous, two-leaved. Peru, 1868. This species is allied to *T. fragrans*.

**T. hymenantha** (membrane-flowered). *fl.* white, small; sepals

**Trichopilia**—continued.

and petals slightly twisted; lip sessile, nearly flat, with erose edges, speckled with deep sanguineous-purple towards the base and sides; racemes six to eight-flowered, drooping. Summer. *l.* thick, fleshy, elongated-ensiform, acuminate, narrowed to the base, the lower part representing a stem or pseudo-bulb. New Grenada, 1854. (B. M. 5949; R. X. O. i. 7.)

**T. Kienastiana** (Kienast's). *fl.* white, with a few yellow lines or spots on the disk of the lip; sepals and petals linear-ligulate; lateral lobes of lip median, obtuse-angled; anterior lobes prorected, wavy, emarginate; peduncle usually two-flowered. *l.* and pseudo-bulbs much like those of *T. suavis*. Habitat unknown. 1883.

**T. lepida** (pretty). *fl.* handsome, 4in. to 5in. in diameter; sepals and petals pale rosy-lilac, irregularly margined with white; lip prominent, fimbriated, in front deep purple-crimson with an irregular margin of white; peduncles deflexed. Spring. *l.* oblong-ovate, acute, leathery. Pseudo-bulbs oblong, obtuse, acictpitous. Costa Rica, 1873. (F. M. ser. ii. 98; W. O. A. v. 197.)

**T. marginata** (margined).\* *fl.* 4in. to 5in. across; sepals and petals brownish-red, with greenish-yellow margins, narrow, once twisted; lip white outside, the mouth three-lobed, the lateral lobes rounded and the central ones emarginate, wavy, reddish-purple, sometimes edged with white, becoming deep crimson in the throat, or with the limb white and the throat only deep crimson; peduncles drooping, one-flowered. May and June. *l.* lanceolate, shortly acuminate, recurved at tip. Pseudo-bulbs clustered, oblong, furrowed, recurved at tip. Central America, 1880. (G. M. B. iii. 185.) *SYN. T. coccinea* (B. M. 4857; L. J. F. 184; L. & P. F. G. ii. 54).

**T. m. flaveola** (yellowish). *fl.*, sepals and petals greenish-yellow; lip and column white. 1880.

**T. mutica** (beardless). *fl.* dirty-white, slightly tinged with red; sepals and petals linear, acute; lip parallel with the column, cordate-ovate, cucullate at base; raceme few-flowered, weak. August. *l.* linear-lanceolate, convex at back. Said to be a native of Trinidad, 1821. *SYN. Macradenia mutica*.

**T. nobilis** (noble).\* *fl.* larger than those of *T. fragrans*, sweet-scented; sepals and petals white, undulated; upper lobes of lip rounded and meeting over the throat, the front one pure snow-white, 1½in. broad, having on each side of the throat an orange-coloured blotch, the two blotches meeting to form a central, eye-like spot; scapes erect, four or five-flowered. *l.* broadly oblong, acute. Pseudo-bulbs elongated, oblong, compressed, clustered. Columbia. A beautiful species, perhaps a variety of *T. fragrans* (under which name it is figured in F. M. ser. ii. 21, I. H. ser. iii. 94, and W. O. A. iii. 128).

**T. picta** (painted). A synonym of *T. Galeottiana*.

**T. rostrata** (beaked). *fl.*, sepals and petals pale whitish-green, linear, acute, the petals twice twisted; lip white, with pale orange rays, flabellate, trifid towards the apex; peduncle two-flowered. *l.* broadly ligulate, acute. Pseudo-bulbs linear-ligulate, the basilar scales slightly dotted. New Grenada, 1872.

**T. sanguinolenta** (dark-bloody). *fl.* rather showy, 2½in. across; sepal and petals yellowish-olive, marked with transverse bands or ocellate markings of brownish-crimson; lip emarginate, recurved, white, flabellately veined, the veins in the basal half marked out by broken lines of crimson. *l.* undulated, petiolate, 4in. to 6in. long. Pseudo-bulbs ovate, elongated. Ecuador, 1843. *SYN. Helcia sanguinolenta* (I. H. ser. iii. 21; L. & P. F. G. ii. 182).

**T. suavis** (sweet).\* *fl.* white or creamy-white, delicately Hawthorn-scented; sepals and petals narrowed to the base, scarcely twisted; lip yellow in the throat, spotted with pale violet-rose on the front part and on the sides, closely rolled up at the base, spread out in a funnel-shaped form, three-lobed in front; peduncles three or four-flowered. March and April. *l.* large, broad-oblong, acute, wavy, nearly sessile. Pseudo-bulbs oblong-obcordate, acictpitous, clustered. Costa Rica, 1850. A fine species. See Figs. 95 and 96. (B. M. 4654; F. d. S. 761; L. J. F. 227; L. & P. F. G. i. 11; W. S. O. iii. 8.)

**T. s. alba** (white). *fl.*, sepals and petals pure white; lip white, marked in the throat with a yellow stain. May and June. (W. O. A. i. 14.)

**T. s. grandiflora** (large-flowered). *fl.* more highly coloured than in the type, and expanding better; sepals and petals white; lip upwards of 3in. in diameter, white, with large, rich crimson spots, the throat deep orange. *l.* (as well as the pseudo-bulbs) very large. A lovely variety.

**Trichopilia**—continued.

**T. tortilis** (twisted). *fl.* drooping, large and attractive; sepals and petals yellowish-green, with lurid brownish-purple blotches along the middle part, spirally twisted, narrow-lanceolate; lip white outside, yellowish-white or white within, thickly spotted with rose-colour and blotched with yellow about the throat, the base closely rolled in, the front part spreading out and three-lobed; peduncle one-flowered. *l.* oblong, acute. Pseudo-bulbs oblong or ligulate, compressed, 2in. to 4in. long. Mexico, 1835. An interesting species. See Fig. 97. (B. iii. 122; B. M. 3739;



FIG. 97. FLOWER AND LEAF OF TRICHOPILO TORTILIS.

B. R. 1863.) There are several varieties of this species. One — *candidum* — has white, and another brighter-coloured, flowers.

**T. Turialvæ** (Turialva), of Bateman. A synonym of *T. Galeottiana*.

**TRICHOPTERIS**. Included under *Alsophila*.

**TRICHOS**. A term, used in Greek compounds, signifying hair-like or hairy; e.g., *Trichocentron*, *Trichomanes*.

**TRICHOSACME** (from *thrix*, *trichos*, a hair, and *acme*, a point; referring to the corolla's hairy appendage). *ORD. Asclepiadæa*. A monotypic genus. The species is a stove, climbing shrub, densely white-woolly on all parts except the corolla. For culture, see *Stapelia*.

**T. lanata** (woolly). *fl.* purple, mediocre or rather small, six to ten in umbelliform cymes; calyx of five lanceolate segments; corolla with a short, rotate tube, the lobes emarginate, the teeth produced in a long, filiform appendage; peduncles opposite the leaves. July. *l.* opposite, petiolate, cordate at base, elliptic or oblong, obtuse or slightly acute. Mexico, 1850. (F. d. S. 1123; L. & P. F. G. i. 105.)

**TRICHOSANTHES** (from *thrix*, *trichos*, a hair, and *anthos*, a flower; alluding to the fringed corolla). Snake Gourd. Including *Eopepon*. ORD. *Cucurbitaceæ*. A genus comprising about thirty species of stove, greenhouse, or half-hardy, climbing, annual or perennial herbs, sometimes shrubby at base, occasionally tuberous-rooted;

**Trichosanthes**—continued.

caducous, the other racemose; bracts occasionally wanting. Female flowers solitary; ovary inferior, at the base of the calyx tube, one-celled, the style three or six-cleft at apex. Fruit lanceolate or globose, smooth, often large. Leaves entire or three to nine-lobed, denticulate; tendrils usually two or three-cleft.

The common name of *T. anguina* refers to its fruits, which are eaten as a vegetable in India. Seeds of the species here described should be sown on a hotbed, in spring, and the plants afterwards treated like Cucumbers.

**T. anguina** (snake-like).\* Common Snake or Viper Gourd; Serpent Cucumber. *fl.*, calyx tube lin. long; the earlier male peduncle occasionally replaced by a female. *fr.* elongated, cylindrical, sometimes twisted, edible. *l.* cordate-sub-reniform, three to seven-lobed or five-angular; lobes pubescent or puberulous on both surfaces, not acuminate. Stems twining, more or less pubescent. India, &c., 1735. Half-hardy. See Fig. 98. (B. M. 722.) SYN. *T. colubrina* (B. R. xxxii. 18).

**T. colubrina** (snake-like). A synonym of *T. anguina*.

**T. japonica** (Japanese). *fl.*, male racemes few-flowered; bracts large, broadly ovate, deeply anulate-toothed; peduncle robust, sulcate. *fr.* ovoid, slightly acute at base and apex. *l.* membranous, broadly ovate, glabrous and smooth, three to five-lobed; lobes triangular, acute, entire or undulate-denticulate on the margins. Stem slender. Japan, 1872. Greenhouse. (R. G. 714.)

**T. Kirilowii** (Kirlow's). *fl.* dioecious; male racemes few-flowered at apex, the bracts acutely toothed. *fr.* ovoid or ovoid-oblong. *l.* sub-orbicular, often deeply palmately five to seven-lobed; lobes oblong or oblong-lanceolate, acute, deeply incised-serrate or lobulate. Stem annual, branched. Root perennial. China, 1872. Greenhouse. SYN. *Eopepon vitifolius*.

**T. palmata** (palmate-leaved).\* *fl.*, male racemes on long, stout peduncles, at first short and head-like, at length elongated, with a toothed or jagged bract, at least lin. across, under each pedicel; female flowers shortly pedicellate. *fr.* nearly globular, 2in. to 3in. in diameter. *l.* broad, palmately three to seven-lobed, pubescent. India and North Australia, 1825. Stove. (B. M. 6873.)

**T. tuberosa** (tuberous-rooted). *fl.*, corolla white, the tube intimately united and incorporated with the tube of the calyx. limb free, of five long, deeply bifid segments, the divisions forked at the extremity. September. *l.* distant, formed of three deeply-cut, linear-oblong, divaricating lobes, acute at the points, the lower ones with a smaller, unidentate lobe at the base. Stems green, climbing. Root a large, rounded tuber. West Indies. Stove. (B. M. 2703.)

**TRICHOSMA** (from *treis*, three and *chosma*, a division; in allusion to the three-lobed labellum). ORD. *Orchideæ*. A

monotypic genus. The species is a very distinct and scarce, stove, epiphytal Orchid. It may be grown in a well-drained pot or pan of fibrous peat and sphagnum. When in active growth, it must be kept moderately moist; and, as it has no fleshy pseudo-bulbs, it must never be allowed to get quite dry.

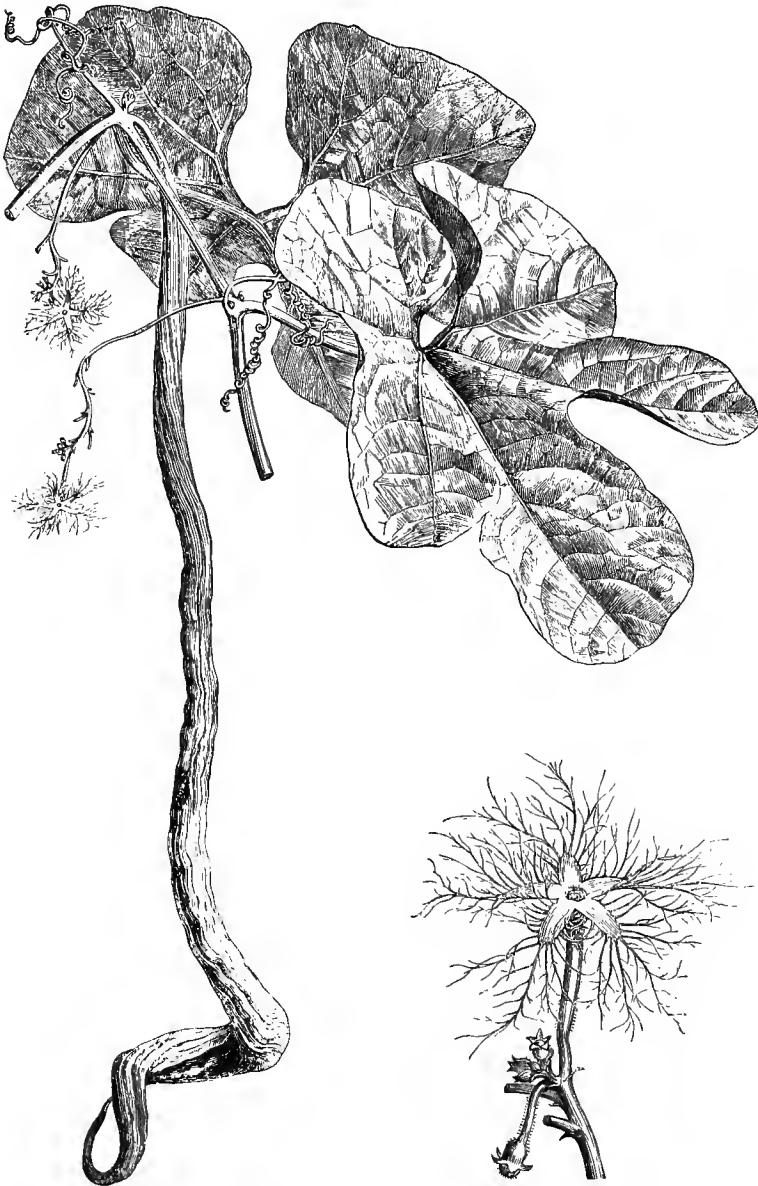


FIG. 98. *TRICHOSANTHES ANGUINA*, showing Portion of Stem, with Fruit and Male Flowers, and detached Cluster of Flowers.

they are found in tropical Asia, North Australia, and Polynesia. Flowers white, dioecious, less often monœcious; calyx long-tubular, with five lanceolate, entire, serrated, or torn segments; corolla five-cleft nearly to the base, the lobes long-fringed. Stamens of the males three; peduncles usually in axillary pairs, one one-flowered and

**Trichosma**—*continued*.

**T. suavis** (sweet). Hair Orchid. *fl.* fragrant, rather large, in a short, terminal raceme; sepals and petals creamy-white, lanceolate; lip three-lobed, the side lobes white, striped with brownish-crimson, the middle one undulated, recurved, yellow, margined with crimson, and bearing several crispy crests on the disk.

**TRICHOSPORUM.** A synonym of **Æschynanthus** (which see).

**TRICHOSTEMA** (from *thrix*, *trichos*, hair, and *stema*, stamen; referring to the capillary filaments). Blue Curls. ORD. *Labiata*. A genus comprising about half-



FIG. 92. FLOWERING BRANCH OF TRICUSPIDARIA HEXAPETALA.

Spring. *l.* two, broadly lanceolate, obsolete three-nerved. Stems thin, tufted, terete, 8in. to 10in. high. Khasya Mountains, 1840. (B. R. 1842, 21; W. O. A. iii. 114.) SYNS. *Cælogyne coronaria*, *Eria coronaria*, *E. suavis*

**TRICHOSORUS.** Included under *Alsophila*.

a-dozen species of hardy, North American herbs. Flowers commonly blue or violet, in axillary, dense or loose, many-flowered whorls. Leaves entire; floral ones conformed. Two of the species have been introduced, but they are probably not now in cultivation.

**TRICHOTOMOUS.** Branching in threes.

**TRICLISSA.** A synonym of **Kniphofia** (which see).

**TRICOCCUS.** A fruit consisting of three cocci, or elastically-dehiscing shells.

**TRICOLOR.** Three-coloured.

**TRICONDYLIUS.** A synonym of **Lomatia** (which see).

**TRICORYNE** (from *treis*, three, and *koryne*, a club; in allusion to the form of the capsules). ORD. *Liliaceæ*. A genus embracing six species of greenhouse perennials with fibrous roots, limited to Australia. Flowers in terminal umbels, with small, imbricated, scarious bracts; perianth spirally twisted after flowering, but at length deciduous, of six narrow, three or five-nerved segments; stamens six, hypogynous. Leaves few and Grass-like or all reduced to scarious scales. Stems usually wiry and branching, the branches often clustered. It is doubtful whether any of the species are in cultivation. *T. elatior* thrives in light, rich soil, and may be increased by divisions.

**T. elatior** (taller). *fl.*, perianth white, usually about  $\frac{1}{2}$  in. long; umbels three, four, or six-flowered. June. *l.*, lower ones often Grass-like, 2 in. to 4 in. long, the upper ones, and sometimes all, reduced to short scales. Stem 1 ft. to 2 ft. high. 1824.

**TRICRATUS.** A synonym of **Abronia** (which see).

**TRICUSPIDARIA** (from *tricuspis*, three-pointed; alluding to the petals). SYN. *Tricuspis*. ORD. *Tiliaceæ*. A small genus (two species) of Chilian, greenhouse trees. Flowers rather large; calyx campanulate, truncate, obsoletely five-toothed, afterwards cut and deciduous; petals five, three-toothed or three-lobed, induplicate-valvate; stamens numerous, inserted above the torus; peduncles axillary, solitary, one-flowered. Leaves alternate and opposite, serrated. *T. hecapetala*, the only species introduced, is a very beautiful, greenhouse shrub. For culture, see **Correa**.

**T. hexapetala** (six-petaled). *fl.* red, on long peduncles. Capsule sub-retund, silky-pilose. *l.* oblong-lanceolate, serrated or rarely entire. See Fig. 98. (Gn., Nov. 1880, under name of *Crinodendron Hookerianum*.)

**TRICUSPIS** (of Palisot de Beauvois). Included under **Triodia** (which see).

**TRICUSPIS** (of Persoon). A synonym of **Tricuspidaria** (which see).

**TRICYRTIS** (from *treis*, three, and *kyrtos*, convex; alluding to the three outer perianth segments having bags at their base). SYNS. *Compsanthus*, *Compsoa*. ORD. *Liliaceæ*. A small genus (five species) of half-hardy perennials, with shortly-creeping rhizomes, natives of the Himalayas, Japan, and China. Flowers few, rather large, on longish pedicels; perianth often elegantly spotted within, campanulate; segments distinct from the base, lanceolate, the outer ones saccate at base, the inner ones flat, all spreading above; stamens six, hypogynous; inflorescence terminal or in the upper axils, loosely dichotomous, erect. Leaves alternate, ovate or oblong, contracted, sub-sessile, or cordate-amplexicaul at base. Stem erect, simple below the inflorescence, leafy. The three species introduced are ornamental plants. They thrive in a compost of sandy loam and peat, and require the shelter of a greenhouse or cold pit in winter. Propagation may be effected by offsets.

**T. elegans** (elegant). A synonym of *T. pilosa*.

**T. hirta** (hairy).\* Japanese Toad Lily. *fl.* six to fifteen, racemose or sub-corymbose; perianth nearly 1 in. long, the segments white, the outer ones decorated with large, purple dots. May. *l.* oblong, cuspidate, cordate-amplexicaul,  $\frac{1}{4}$  in. to  $\frac{1}{2}$  in. long, slenderly pilose, Stem 1 ft. to 3 ft. high, clothed with soft, white, slightly spreading pil. Japan, 1863. See Fig. 100. (B. M. 5355.)

**T. macropoda** (large-footed).\* *fl.* on pedicels  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, disposed in a loose corymb; perianth whitish-purple, with minute, purple dots, nine to ten lines long. May. *l.* oblong, acute,  $\frac{1}{2}$  in. to 5 in. long,  $\frac{1}{2}$  in. to 2 in. broad, sessile or very shortly petiolate,

**Tricyrtis**—continued.

rounded at base, glabrous above, pubescent beneath. Stem 2 ft. to 3 ft. high. Japan and China, 1869. (B. M. 6544; R. G. 613.)

**T. m. striata** (striped). A pretty plant, having leaves striped with white. (F. d. S. 1820, under name of *T. foliis albo-striatis*.)

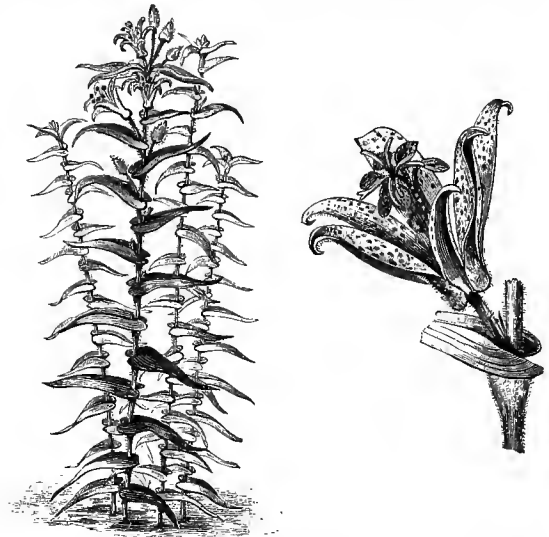


FIG. 100. TRICYRTIS HIRTA, showing Habit, and Portion of Stem, with Flower.

**T. pilosa** (pilose). *fl.* many, loosely corymbose; perianth eight to nine lines long, the segments whitish, marked with large, purple spots. May. *l.* oblong, cuspidate, cordate-amplexicaul,  $\frac{1}{4}$  in. to  $\frac{1}{2}$  in. long, slenderly pilose. Stem 2 ft. to 4 ft. high, pilose. Himalayas, 1851. (B. M. 4955; F. d. S. 1219.) SYN. *T. elegans*.

**TRIDAX** (from *Thridax*, the old Greek name used by Dioscorides for the Lettuce, from *treis*, three, and *akis*, a point; alluding to the ray florets). SYNS. *Balbisia* (of Willdenow), *Bartolina*. Including *Galinsogea* and *Ptilostephium*. ORD. *Compositæ*. A genus embracing seven species of hardy, perennial herbs, natives of tropical America. Flower-heads yellow, or the disk greenish, mediocre, long-pedunculate, heterogamous; ray florets ligulate or sub-bilabiate, the outer lip large, sometimes three-toothed, three-cleft, or three-parted, the inner smaller or minute, two-lobed or two-parted, sometimes obsolete; involucre bracts in few series; receptacle flat or convex; achenes turbinate, silky-villous. Leaves opposite, incised-toothed or pinnately dissected; segments few, narrow. The species possess but little beauty, and require ordinary culture. Propagated by divisions, or by seeds.

**T. coronopifolium** (Coronopus-leaved). *fl.* heads yellow; ray florets unequally five-lobed; outer involucre scales obtuse or mucronate. June. *l.* variously pinnatifid or trifid; lobes linear, acute. *h.* 1 ft. Mexico. SYN. *Ptilostephium coronopifolium*.

**T. trilobata** (three-lobed). *fl.* heads yellow; ray florets five-toothed; pappus bristles very short and scarcely pinnately lobed, or longer and plumose-fimbriate; peduncles pubescent or glandular-puberulous at apex. June. *l.* three-lobed or pinnately incised. *h.* 1 ft. Mexico. SYN. *Galinsogea trilobata* (B. M. 1895; S. B. F. G. 56).

**TRIDENS.** Included under **Triodia** (which see).



FIG. 101. TRIDENTATE LEAF.

**TRIDENTATE.** Trident-pointed. A Tridentate leaf is shown at Fig. 101.

**TRIDENTEA.** Included under **Stapelia** (which see).

**TRIDIA.** Included under **Hypericum** (which see).

**TRIENTALIS** (a Latin term, signifying one-third of a foot in height; in reference to the stature of the plants). Chickweed Wintergreen. ORD. *Primulacæ*. A small genus (two species) of highly glabrous, hardy herbs, with creeping, perennial rhizomes; one is found in Europe, North Asia, and North-west America. Flowers white; calyx five to nine-parted, persistent; corolla hypogynous, rotate, five to nine-parted, the tube very short, the segments elliptic-lanceolate; stamens five to nine; peduncles one to three, one-flowered, filiform, ebracteate. Leaves usually as many as the petals, somewhat whorled, obovate-elliptic or lanceolate, entire. Stems solitary, slender, erect. These pretty little plants require a light, rich soil and a shady situation. Propagated, in spring, by seeds, covered with a handlight; or by divisions.

**T. americana** (American). Star Flower. *fl.*, divisions of the corolla finely acuminate. May. *l.* lanceolate, acuminate at both ends. Stem very naked below, unequally five to nine-leaved at the summit, 9in. high. North-west America, 1816.



FIG. 102. TRIENTALIS EUROPEA, showing Habit and detached Flower.

**T. europæa** (European). *fl.* few, erect; corolla ½in. to ¾in. in diameter, the lobes ovate, acute. June and July. *l.* obovate or obovate-lanceolate, 1½in. to 2½in. long, shining, rigid, obtuse or acute, narrowed into short petioles. Stem wiry, slender, leafy at top, 4in. to 8in. high. Europe (Britain), &c. See FIG. 102. (L. B. C. 105; Sy. En. B. 1139.)

**TRIFARIOUS.** Arranged in a triple rank, or in three rows.

**TRIFID.** Split half-way into three parts.

**TRIFOLIOLATE.** Bearing three leaflets from the same point; e.g., Clover.

**TRIFOLIUM** (from *tres*, three, and *folium*, a leaf; most of the species have trifoliate leaves). Clover; Trefoil. Including *Lupinaster* and *Pentaphyllon*. ORD. *Leguminosæ*. A large genus (nearly 280 species have been described, of which, probably, not more than 150 are really distinct) of hardy, annual or perennial herbs, copiously dispersed over the temperate and sub-tropical regions of the Northern hemisphere, a few being also found in the mountains of tropical America, Africa, and extra-tropical South America. Flowers often purple, red, or white, rarely yellow, spicate, capitate, umbellate, or rarely solitary; calyx teeth or lobes sub-equal, or the

### Trifolium—continued.

lower ones longer; petals often marcescent, all long-clawed, or the four lower ones more or less adnate with the staminal tube; standard oblong or ovate; wings narrow; keel shorter than the wings, obtuse; stamens diadelphous. Pod oblong and sub-terete, or obovate-compressed, indehiscent. Leaves digitately three, rarely five or seven, foliolate, sometimes pinnately three or very rarely five-foliate; stipules adnate with the petioles. This genus embraces several important fodder-plants. Eighteen species are included within the British Flora, viz., *T. arvense* (Hare's-foot Clover), *T. Bocconi*, *T. filiforme* (Yellow Suckling Clover), *T. fragiferum* (Strawberry Clover), *T. glomeratum*, *T. incarnatum* (Crimson or Carnation Clover), *T. maritimum*, *T. medium* (Cow Grass), *T. meadow or Zigzag Clover*, *T. minus*, *T. ochroleucum*, *T. pratense* (Red or Broad-leaved Clover; Marl-grass), *T. procumbens* (Hop Trefoil), *T. repens* (White or Dutch Clover; Shamrock), *T. scabrum*, *T. striatum* (Knotted Clover), *T. strictum*, *T. subterraneum*, and *T. suffocatum* (Sand Clover); and *T. hybridum* (Alsike or Bastard Clover) has become naturalised. Four-leaved Shamrocks and other Clovers are considered "lucky," as being rare, but are by no means unfrequently met with. Few of the species of *Trifolium* boast of much horticultural merit; the selection given below embraces all that call for description here. All thrive in common garden soil. The annuals and biennials may be increased by seeds, and the perennials by divisions. Except where otherwise stated, the under-mentioned plants are perennials.

**T. alpestre** (alpine). \* Owl-headed Clover. *fl.* purple; lower calyx segment longer than the gamopetalous corolla, the rest short and tooth-like; heads globose. June and July. *l.* leaflets lanceolate, coriaceous, ciliately serrulated; stipules narrow, nearly sessile, long. Stem erect, simple. *h.* 6in. to 12in. Alps of Europe and Western Asia, 1789. (B. M. 2779.)

**T. cæruleum** (blue). A synonym of *Trigonella cærulea*.

**T. canescens** (hoary). *fl.* cream-coloured; calyx smooth, the lowest segment a little longer than the rest; corolla gamopetalous, much longer than the calyx segments; heads terminal, large, oblong, nearly sessile. May and June. *l.* leaflets obovate, emarginate, villous; stipules lanceolate-sulcate. Stems ascending, adpressedly hairy. Cappadocia, &c., 1803. (B. M. 1168.)

**T. fimbriatum** (fringed). *fl.* purple; calyx teeth spiny, half as long as the slender corolla; heads lin. in diameter. September and October. *l.* leaflets oblong or slightly cuneate, lin. or more in length, conspicuously fringed with spinulose-setaceous teeth. Stems long and thick, prostrate, glabrous. North America, 1825. (B. R. 1070; L. B. C. 1421.)

**T. fucatum** (painted). *fl.* cream-colour mixed with red; corolla many times longer than the calyx; heads lin. to 2in. in diameter, somewhat hemispherical, few-flowered; peduncles axillary, mostly longer than the leaves. June. *l.* leaflets roundish-cuneiform, sharply denticulate, rather thick; stipules large, entire, mucronate. *h.* 6in. California, 1824. Annual. (B. R. 1883.)

**T. hybridum** (hybrid). Alsike or Bastard Clover. *fl.* white or rosy, ½in. long, drooping; heads axillary, peduncled, globose, ½in. to 1in. in diameter. June to August. *l.* on long petioles; leaflets obovate or oblong, ½in. to 1½in. long, toothed; stipules oblong, with triangular tips. Stems ½in. to 10in. long, flexuous. Europe, &c. (B. M. 3702.)

**T. incarnatum** (flesh-coloured). Crimson Clover. *fl.* bright scarlet, ½in. long; calyx hairy; heads peduncled, terminal, ovoid or cylindric, lin. to 2in. in diameter. June and July. *l.* on short petioles; leaflets broadly obovate or orbiculate, ½in. to 1½in. long; stipules obtuse. Stems rather slender, clothed with spreading hairs. *h.* 1ft. South Europe, 1640. Annual. (B. M. 328.)

**T. Lupinaster** (Lupinaster). \* Bastard Lupine. *fl.* purple, large, the wings and keel paler than the standard; heads pedunculate, bractless, umbellate. June to August. *l.* sessile; leaflets five, linear-lanceolate, sharply toothed, mucronate; stipules broad, acuminate. *h.* 1ft. to 1½ft. Siberia, 1741. (B. M. 879.) *albi-florum* is a white-flowered form.

**T. olympicum** (Olympic). *fl.* yellowish; calyx hairy; standard very long; spikes oblong, solitary. July. *l.* leaflets hairy, elliptic-lanceolate, entire; stipules subulate, sheathing. Stem erect, hairy. *h.* 1ft. Mount Olympus, 1817. (B. M. 2790.)

**T. reflexum** (reflexed). Buffalo Clover. *fl.* handsome; standard rose-red, broadly ovate; wings and keel white; heads sub-umbellate, dense; peduncles about twice the length of the heads. April to June. *l.* leaflets obovate or obovate-oblong,



**Trifolium**—*continued*.

sometimes emarginate, crenulate-serrulate; stipules leafy, acuminate. Stem ascending or decumbent, 1ft. to 1½ft. long. North America, 1794. Annual. (B. M. 3471.)

**T. rubens** (reddish). *fl.* carmine or purple-red; heads peduncled, ovoid, large. Summer. *l.* stalked; leaflets long, narrow; stipules large. Stems erect. *h.* 1ft. Central and South Europe. (R. G. 1886, p. 243.)

**T. spadicum** (chestnut-brown). Brown Clover. *fl.* yellow; standard slightly ferruginous, obcordate; heads ovoid, pedunculate. June to August. *l.* stalked; leaflets oblong-ovate, sessile, denticulated; stipules leafy, acuminate. Stem erect, 6in. high. Europe, 1778. (B. M. 557.)

**T. uniflorum** (one-flowered).\* *fl.* axillary, solitary, on short peduncles; corolla very long, the standard blue, the wings and keel purple. May to September. *l.* leaflets three, ovate, acuminate, toothed, nerved; stipules sheathing, long-acuminate. Stems very short. Syria, &c., 1800. Plant tufted, creeping. (L. B. C. 1882; S. B. F. G. ser. ii. 200.) The form *Sternbergianum* has white flowers.

**T. vesiculosum** (bladdery-calyned). *fl.*, reddish; calyx scarious, inflated, the segments subulate, much shorter than the corolla; heads ovate, thick, on long peduncles. June and July. *l.* leaflets lanceolate, acute, sharply serrulated; stipules narrow, long-acuminate. Stems erect, firm, 9in. high. South Europe, 1805. (B. R. 1403.)

**TRIFURCIA** (from *tres*, three, and *furca*, a fork; alluding to the three-forked style). The correct name, according to Bentham and Hooker, is *Alophia*. SYN. *Herbertia*. ORD. *Iridææ*. A small genus (three or four species) of pretty, American, stove, greenhouse, or hardy, bulbous plants. Flowers long-pedicellate; perianth tube none; segments free, the three outer ones shortly unguiculate, spreading, obovate or broadly oblong, the three inner ones much smaller, acute, erect or scarcely spreading; filaments connate in a cylindrical tube; spathes narrow. Leaves few. Bulb tunicated. Only two species call for description here. They thrive in a mixture of equal parts loam, peat, and sand. With protection in winter, the plants will succeed in the open border. Propagation may be effected by offsets, or by seeds.

**T. cœrulea** (blue). *fl.*, outer perianth segments having a white claw, dotted with blue, the blade blue, with a deeper-coloured, triangular mark at base; inner segments blue, deeper-coloured in the middle; anthers and stigma short; peduncle shorter than the bracts. April. Texas, 1842. Half-hardy. SYN. *Herbertia cœrulea* (B. M. 3862, figs. 3, d, e, f).

**T. pulchella** (pretty). *fl.*, limb of the outer perianth segments lilac, undulated, the claw pale-yellowish or whitish, dotted with purple; inner segments deeper-coloured in the middle; anthers subulate, exceeding the stigma. July. *l.* 5in. or more long. Buenos Ayres, 1827. Greenhouse. SYN. *Herbertia pulchella* (B. M. 3862, figs. 1, 2; L. B. C. 1547; S. B. F. G. 222).

**TRIGLOCHIN** (from *treis*, three, and *glochin*, a point; in reference to the three angles of the carpel). Arrow Grass. ORD. *Naiadaceæ*. A genus consisting of about a dozen species of greenhouse or hardy, marsh-loving, erect, scape-bearing herbs, broadly dispersed over mostly temperate and frigid regions. Flowers small or rather large, spicate or shortly pedicellate and racemose, erect, ebracteate and ebracteolate; perianth segments scale-like, three, six, or rarely fewer; stamens six. Leaves elongated, flat or somewhat terete, sometimes swimming. Two species—*T. maritimum* and *T. palustre*—are British plants. *T. bulbosum* is the only one calling for description here. It thrives in pots of loamy soil, the bottoms of which are immersed in water.

**T. Barrelieri** (Barrelier's). A synonym of *T. bulbosum*.

**T. bulbosum** (bulbous-rooted). *fl.* purplish, numerous and very variable, pedicellate, disposed in a simple, elongated raceme; scape erect, smooth. October. *l.* semi-cylindrical, linear, bilobed, complanate or scarcely channelled above, the outer ones often reduced to sheaths. Rhizome short, more or less tuberous. *h.* 1ft. Europe, Asia Minor, and South Africa, 1806. Greenhouse. (B. M. 1445; L. B. C. 1151.) SYN. *T. Barrelieri*.

**TRIGLOSSUM**. A synonym of *Arundinaria* (which *see*).

**TRIGONAL**. Three-angled, and having three plain faces.

**TRIGONELLA** (from *treis*, three, and *gonu*, an angle; the standard of the flower is flat, while the wings spread, thus imparting a triangular appearance). Fenugreek. Including *Pocockia*. ORD. *Leguminosæ*. A genus comprising nearly fifty species of hardy, often strong-smelling, annual or perennial herbs; one is Australian, and the rest are dispersed over Europe, Asia, and Africa. Flowers yellow, blue, or white, variously disposed; calyx tubular or short, with sub-equal teeth or lobes; petals free of the staminal tube; standard obovate or oblong, sessile or contracted into a broad claw; wings oblong; keel obtuse. Leaves pinnately trifoliate; stipules adnate with the petioles. Scarcely any of the species are worth growing. The seeds of *T. Fœnum-Græcum* were anciently held in great repute for medicinal and culinary purposes; but their use in medicine is with us confined to veterinary practice. The genus is represented in Britain by *T. ornithopodioides*. Sowing in the open border is all that is required by the under-mentioned species.

**T. cœrulea** (blue). *fl.* in dense, pedunculate heads; petals white, lined with blue. July and August. *l.* leaflets ovate, the lower ones roundish-ovate, denticulated; stipules lanceolate, toothed at base. Stems erect, 1ft. to 2ft. high. Bohemia and Switzerland, 1562. Annual. SYN. *Trifolium cœruleum* (B. M. 2283).

**T. Fœnum-Græcum**. Fenugreek. *fl.* white; calyx pilose, the subulate teeth as long as the tube. June to August. *l.* leaflets obovate, obsoletely toothed; stipules lanceolate-falcate, entire. Stem erect, simple, 1ft. to 2ft. high. South of France, 1597. Annual. (B. M. Pl. 71; S. F. G. 766.)

**T. ruthenica** (Russian). *fl.* yellow, disposed in racemose heads. June and July. *l.* lanceolate, very obtuse, sharply serrulated; stipules nearly entire. Stems prostrate, ascending, 1½ft. long. Siberia, 1759. Perennial. (L. B. C. 1391.)

**TRIGONIA** (from *treis*, three, and *gonu*, an angle the fruit is triangular). SYN. *Mainea*. ORD. *Vochysiaceæ*. A genus embracing about twenty-five species of climbing or sarmentose, stove shrubs, natives of Brazil and Guiana. Flowers often small, in terminal panicles or racemes; sepals and petals five each; stamens five to twelve. Leaves opposite, on short petioles; stipules caducous. Three species have been introduced, but are now probably lost to cultivation.

**TRIGONIDIUM** (from *trigona*, a triangle, and *eidos*, like; alluding to the triangular form of several parts of the plants). ORD. *Orchidææ*. A small genus (seven or eight species have been described) of curious, stove, epiphytall Orchids, inhabiting tropical America. Flowers rather large, shortly pedicellate within epathaceous bracts; sepals sub-equal, connivent or coherent at base in a triquetron, turbinate tube, free above, spreading; petals similar, but much smaller; lip rising from the base of the column, erect, much shorter than the sepals, the lateral lobes erect, embracing the column, the middle one spreading; pollen masses four; scape many-nerved, one-flowered. Stem very short, mostly pseudo-bulbous. A selection of the species known in gardens is given below. They thrive on blocks, or in baskets of peat, fibre, and sphagnum, and like a fairly light position, near the glass.

**T. acuminatum** (taper-pointed). *fl.* dull straw-colour externally, within elegantly pencilled with rich brown; sepals acuminate, recurved at apex; petals oval-lanceolate, mucronate. *l.* linear, longer than the peduncles. Pseudo-bulbs ovate, acute, sulcate, one-leaved. Demerara, 1834.

**T. Egertonianum** (Sir P. Egerton's). *fl.* pale liver-colour, dashed and veined with brown; sepals acute, the lateral ones reflexed; petals slightly acute. *l.* narrow, often 1½ft. long, ensiform. Pseudo-bulbs clustered, oval, compressed, two-leaved. Honduras, 1834. A very distinct species.

**T. obtusum** (obtuse).\* *fl.*, sepals reddish-yellow, obovate; petals white, veined with rose, brown at apex, obtuse; lip white, tubercled at back, the lateral lobes red-margined, the middle one yellow in front. *l.* linear-lanceolate. Demerara, 1834. (B. R. 1923.)

**T. tenue** (slender). *fl.* brownish-purple; sepals reflexed, very acuminate; lip obtuse, glabrous, reflexed at apex; scape erect, slender. *l.* ensiform, very acute, longer than the scape. Pseudo-bulbs oval, compressed, one-leaved. Demerara, 1836.

**TRIGONOTHECA.** A synonym of *Catha* (which see).

**TRIGUERA.** Included under *Hibiscus*.

**TRIGYNOUS.** Having three styles.

**TRILISA** (from *trilia*, triple; in allusion to the divisions of the pappus). ORD. *Compositae*. A small genus (two species) of hardy, erect, perennial herbs, natives of North America. Flower-heads purplish or white, rather small, paniculate; florets equal, regular, tubular, five-cleft; involucre bracts in two or three series; receptacle flat, naked. Leaves alternate, entire, amplexicaul; radical ones elongated. Only one species calls for description here. It thrives in any moderately good, light soil. Propagation may be effected by divisions, in spring; or by seeds, which are usually sown early in autumn.

**T. odoratissima** (very odorous). Vanilla Plant. *fl.* heads bright purple, numerous, pedicellate; involucre scales glandular. September. *l.* thick; radical ones large, obovate-spathulate, tapering at base, often slightly and obtusely toothed; cauline ones oblong, clasping at base, the upper ones small and scattered. Stem 2ft. to 4ft. high, corymbose at top. 1786. The leaves, when bruised, exhale the odour of vanilla. SYN. *Liatris odoratissima* (A. B. R. 635; S. B. F. G. ser. ii. 184).

**TRILIX.** A synonym of *Prockia* (which see).

**TRILLIACEÆ.** Included under *Liliaceæ*.

**TRILLIUM** (from *trilia*, triple; alluding to the triple parts of the flowers and leaves). American Wood Lily; Indian Shamrock; Three-leaved Nightshade. ORD. *Liliaceæ*. A genus comprising about a dozen species of hardy, perennial herbs, with short, thick rhizomes, natives of North America and extra-tropical Asia, from the Himalayas, as far as Japan. Flowers solitary, erect, drooping or reflexed, sessile or pedicellate within the leaves; perianth violet, lurid, white, or greenish, persistent; segments distinct, spreading, the three outer ones slender and herbaceous, green or rarely coloured, the three inner ones petaloid, often larger, less spreading, or sometimes recurved; stamens six; style deeply trifid, or three-parted from the base. Berry globose or ovoid, indehiscent. Leaves three, whorled at the apex of the stem, broad, sub-sessile or rather long-petiolate, three to five-nerved and reticulate-penniveined. Stem simple, erect, with a few short, scarious sheaths at base. The species best known to cultivation are here described. All are North American, and have violently emetic roots. A deep, well-drained bed of peaty soil, in a somewhat shady position, is the most suitable for these plants. During summer, a plentiful supply of water is essential. They may be increased, rather slowly, by dividing the roots, or by seeds. *T. grandiflorum* is the best species, and is one of the most desirable hardy plants for all collections.

**T. Catesbæi** (Catesby's). A synonym of *T. stylosum*.

**T. cernuum** (drooping). *fl.* small; inner perianth segments white, eight to twelve lines long, oblong-ovate, wavy, recurved, rather longer than the lanceolate outer ones; peduncle usually shorter than the flower. April and May. *l.* broadly rhomboidal, 2in. to 6in. long, abruptly acuminate, shortly petiolate. Stems two or three together, 1½ft. high. 1758. (B. M. 954.)

**T. discolor** (two-coloured). *fl.* inner perianth segments dark purple, varying into green, 1½in. to 2in. long, erect, oblong, obtuse, narrowed below; outer ones shorter, lanceolate, spreading. February and March. *l.* sessile, 3in. to 5in. long, ovate-lanceolate to broadly ovate, tapering from near the base to the apex, variegated above with green and brown, or dark purple. Stem stout, solitary, 6in. to 12in. high. 1831. (B. M. 3097.) According to Sereno Watson, the correct name of this plant is *T. sessile* Wrayl.

**T. erectum** (erect).\* Beth-root; Birth-root; Lamb's Quarters. *fl.* 1in. to 1½in. long, spreading, fetid; inner perianth segments dark purple, oval or oblong, rather longer than the lanceolate outer ones; peduncles 1½in. to 3in. long, at length declined. May. *l.* sessile, broadly rhomboidal, abruptly acuminate, acute at base. Stem solitary, 1ft. high. 1759. See Fig. 103. (B. M. 470; F. d. S. 990; L. B. C. 1838.) SYNS. *T. fetidum* (G. C. n. s., xix., p. 605), *T. pendulum* (R. G. 666), *T. rhomboideum* (B. 138).

**Trillium—continued.**

**T. e. album** (white). *fl.*, inner perianth segments greenish-white, or rarely yellowish. (B. M. 1027; L. B. C. 1850.)

**T. e. ochroleucum** (yellowish-white). *fl.*, inner perianth segments yellowish-white. (B. M. 3250, under name of *T. e. viridiflorum*.)

**T. erythrocarpum** (red-fruited).\* Painted Wood Lily. *fl.* 2in. to 1in. long; inner perianth segments white, striped with purple at the base, oblong, wavy, much longer than the lanceolate outer ones; peduncle 1in. to 2in. long, erect. April and May. *fr.* red. *l.* ovate, 3in. to 5in. long, long-acuminate, rounded at base, shortly petiolate. Stem solitary, 1ft. high. 1811. (B. M. 3002; L. B. C. 1232; S. B. F. G. 212.)

**T. fetidum** (fetid). A synonym of *T. erectum*.

**T. grandiflorum** (large-flowered).\* Wake Robin. *fl.* 2in. long; inner perianth segments white, changing to rose-colour, obovate, much longer and broader than the lanceolate outer ones; peduncle longer than the flower, erect or slightly declined. May. *l.* 3in. to 5in. long, rhombic-ovate, abruptly acuminate, nearly sessile. Stem solitary, 1ft. to 1½ft. high. 1799. A fine plant. (F. d. S. 991; L. B. C. 1349; R. G. 575; B. M. 855, under name of *T. erythrocarpum*.)

**T. nervosum** (nerved). A synonym of *T. stylosum*.

**T. nivale** (snowy).\* *fl.* inner perianth segments, white, oblong, obtuse, 1in. long, scarcely wavy, spreading from an erect base, equalling the peduncle; outer ones lanceolate, obtuse. April. *l.* 1in. to 2in. long, oval or ovate, obtuse, rounded at base, distinctly petiolate. Stem 2ft. to 4ft. high. 1879. (B. M. 6445.)

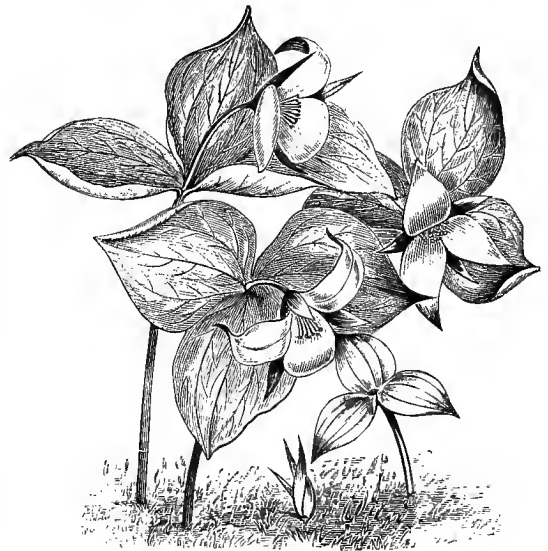


FIG. 103. TRILLIUM ERECTUM.

**T. obovatum** (obovate). *fl.*, inner perianth segments pink, above 1in. long, elliptic-ovate, obtuse; inner ones shorter, oblong; peduncle erect, 1in. long. April. *l.* sessile, roundish-rhomboid, abruptly acuminate, green above, scarcely paler beneath, glabrous, 2½in. long. Stem erect, 8in. to 10in. high. 1810. This is regarded by Sereno Watson as probably identical with *T. erectum*.

**T. pendulum** (pendulous). A synonym of *T. erectum*.

**T. rhomboideum** (rhomboid). A synonym of *T. erectum*.

**T. sessile** (sessile). *fl.* ten to fifteen lines long, sessile, erect; inner perianth segments dark purple, lanceolate, erect, much longer than the lanceolate, spreading sepals. March and April. *l.* sessile, 1in. to 3in. long, broadly oval, widest in the middle, abruptly pointed, narrowed at base, variegated above with paler and deeper green. Stems slender, 6in. to 12in. high, commonly two or more in a cluster. 1759. (B. M. 40; F. d. S. 2311; L. B. C. 875.)

**T. s. Wrayl.** See *T. discolor*.

**T. stylosum** (large-styled). *fl.* 1½in. to 2in. long; inner perianth segments tinged with rose-colour, oblong, much longer and broader than the sepals; styles united below the middle; peduncle 1½in. to 2in. long. April and May. *l.* oval or oblong, 4in. long, acute, shortly petiolate. Stem solitary, slender, 1ft. to 1½ft. high. 1823. SYNS. *T. Catesbæi*, *T. nervosum*.

**TRILOBATE.** Three-lobed. A Trilobate leaf, with ciliated margins, is shown at Fig. 104.



FIG. 104. TRILOBATE LEAF, WITH CILIATED MARGINS.

**TRIOCLULAR.** Three-celled.

**TRIMERISMA.** A synonym of *Platylophus* (which see).

**TRIMESTRIS.** Existing for three months.

**TRIMEZIA** (from *treis*, three, and *merizo*, to divide; in allusion to the trimerous division of the flower). **SYNS.** *Lansbergia*, *Poarchon*, *Remaclea*, *Xanthocromyon*. **ORD.** *Iridææ*. A genus embracing about half-a-dozen species of stove, bulbous plants, natives of the West Indies and South America. Flowers many in a spathe, pedicellate; perianth tube none, the segments free, shortly unguiculate; stamens opposite the outer perianth segments; spathe solitary, terminal, or two or three at the axils of the floral leaves. Leaves few at the base of the stem, long, flat, and prominently ribbed, sometimes terete and Rush-like; floral one solitary, or the stem wholly leafless. Only one species has been introduced. For culture, see *Iris*.

**T. martinicensis** (Martinique). *fl.* four to six in a cluster; perianth segments bright yellow, very fugacious, the three outer ones  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, mottled at the throat, the three inner much smaller; scape equalling the leaves, with a single, reduced, clasping leaf. April. *l.* radical ones about six, erect, narrow-linear, 1 ft. long, three to four lines broad, gradually narrowed to a point. West Indies, &c., 1848. **SYNS.** *Cipura martinicensis* (Ref. B. 310), *Iris martinicensis* (B. M. 416), *Lansbergia caracasana*.

**TRINIA** (named in honour of Dr. Karl B. Trinius, 1778-1844, a Russian botanist). **ORD.** *Umbelliferae*. A genus embracing seven or eight species of hardy, much-branched, perennial herbs, inhabiting the Mediterranean region and temperate Asia, one—*T. vulgaris*—being a native of Britain. Flowers yellowish or white, in compound, often few-rayed umbels. Leaves pinnately or subternately decomposed. The species are of no interest from a garden standpoint.

**TRINODAL.** Having only three nodes.

**TRIODIA** (from *treis*, three, and *odous*, teeth; referring to the three-toothed glumes). **SYN.** *Uralepis* (erroneously spelt *Uralepis*). Including *Tricuspis* and *Tridens*. **ORD.** *Gramineæ*. A genus comprising upwards of twenty species of greenhouse or hardy, perennial Grasses, natives of Europe, extra-tropical America, South and sub-tropical Africa, Australia, and New Zealand, a few being also found in tropical America. Spikelets many-flowered, usually erect; glumes rather rigid, one to three-nerved, the two lower ones empty; panicle terminal, narrow or ample. Leaves narrow. *T. decumbens* (Heath Grass) is a native of Britain. Several species have been introduced, but they have no value from a garden standpoint.

**TRIGECIOUS, TRIOICUS.** Having male flowers on one individual, females on another, and hermaphrodite on a third.

**TRIOLENA** (from *treis*, three, and *olene*, the arm; alluding to the three processes from the base of the anthers). **ORD.** *Melastomaceæ*. A small genus (three species) of nearly glabrous, pilose or paleaceous, stove herbs, natives of Mexico, Venezuela, and New Grenada. Flowers disposed in scorpioid racemes or spikes; calyx tube short, at length three-winged, the lobes five; petals five, obovate; stamens ten, sub-equal; anthers dissimilar. Leaves ample, petiolate, ovate or oblong. *T. scorpioides*, a perennial with the habit of *Bertolonia*, is the only species

*Triolena*—continued.

introduced. It requires a compost of rich, sandy loam and leaf mould, and a moist heat. Propagated by seeds; or by cuttings, inserted in sandy loam, under a bell glass, in bottom heat.

**T. scorpioides** (scorpioid-flowered). *fl.* disposed in scorpioid racemes at the tips of axillary peduncles; petals oblong-obovate. *l.* somewhat acuminate, lightly serrulated. Stem lin. or rather more in length, somewhat woody. *h.* 6 in. Chiapas, 1859.

**TRIONUM.** Included under *Hibiscus* (which see).

**TRIOPTERYS** (from *treis*, three, and *pteron*, a wing; the samaras are three-winged). **ORD.** *Malpighiaceæ*. A small genus (three species) of stove, climbing shrubs, inhabiting the West Indies and Mexico. Flowers blue or violet; calyx five-parted, with eight glands; petals clawed; stamens ten, all perfect, the alternate ones longer; racemes or panicles axillary and terminal; peduncles bracteate and bibracteolate at base. Leaves opposite, highly glabrous, lucid, veined, petiolate, without glands or stipules. It is doubtful whether the plants here described are still in cultivation, as they are very shy flowerers in this country. A compost of peat and sand is best suited to their requirements. Propagation may be effected by ripened cuttings, inserted in sand, under a hand glass, in heat.

**T. rigida** (rigid). *fl.* blue; racemes distant, forming a loose panicle. May. *l.* rigid, coriaceous, orbicular-obovate, elliptic, or oblong-linear, shining, with many parallel and anastomosing veins. West Indies, 1822.

**T. r. jamaicensis** (Jamaica). *l.*  $\frac{1}{2}$  in. to lin. long,  $\frac{1}{4}$  in. to  $\frac{1}{2}$  in. broad.

**T. r. lucida** (clear). *l.* retuse or blunt,  $\frac{1}{2}$  in. long, eight to sixteen lines broad.

**TRIOSTEUM** (from *treis*, three, and *osteon*, a bone; alluding to the three bony seeds, or rather nutlets). **Feverwort; Horse Gentian.** **ORD.** *Caprifoliaceæ*. A genus comprising three species of hardy, perennial herbs; one is Himalayan and the others are North American. Flowers dirty white, yellow, or purple, often axillary, solitary or clustered, rarely spicate; calyx tube ovoid, the limb of five persistent lobes; corolla tubular-campanulate, the tube gibbous at base; limb oblique, with unequal, imbricated lobes; stamens five. Drupe two to (rarely) five or six-stoned. Leaves opposite, slightly connate at base, sessile, somewhat panduriform or obovate, entire. *T. perfoliatum*, the best-known species, thrives in a light, sandy soil with a little leaf mould. It may be multiplied by divisions of the plant, in spring; or by cuttings of the young shoots, inserted under a handlight, in the beginning of summer.

**T. perfoliatum** (perfoliate-leaved). *fl.* brownish-purple, mostly clustered, sessile. June. *fr.* orange-colour,  $\frac{1}{2}$  in. long. *l.* oval, abruptly narrowed below, downy beneath. *h.* 2 ft. to 4 ft. North America, 1730. Plant softly hairy. (S. B. F. G. ser. ii. 45.)

**TRIPARTED, TRIPARTITE.** Parted to the base in three divisions.

**TRIPETALEIA.** A synonym of *Elliottia* (which see).

**TRIPETELUS.** A synonym of *Sambucus* (which see).

**TRIPHENA.** See *Tryphæna*.

**TRIPHASIA** (from *triphasios*, triple; alluding to the number of sepals and petals). **ORD.** *Rutaceæ*. A monotypic genus. The species is a greenhouse, evergreen, spiny shrub. Its fruits, when ripe, have an agreeable, sweet taste; they are sometimes preserved whole in syrup, and are occasionally sent to this country from Manilla as Lime berries. The plant succeeds in a compost of turfy loam and peat, and requires careful watering in winter. Propagation may be effected by cuttings, inserted in sand, under a glass, in heat.

**T. trifoliata** (three-leaved). Lime-berry Tree of Manilla. *fl.* white, sweet-scented, solitary, axillary; calyx three-lobed; petals three, free, imbricated; stamens six, free, sub-equal.

**Triphasia**—continued.



FIG. 105. FRUITING BRANCH OF *TRIPHASIA TRIFOLIATA*.

May to July. *fr.* red-bay colour, ovoid, as large as a hazel nut, by abortion one or two-celled, one or two-seeded. *l.* alternate, trifoliate; leaflets ovate, obtuse, often crenate, the lateral ones smaller. *h.* 5ft. China (and broadly cultivated), 1798. See Fig. 105.

**TRIPHORA.** Included under *Pogonia* (which see).

**TRIPHYSARIA** (from *treis*, three, and *physis*, a bladder; alluding to the three saccate segments of the lower lip of the corolla). *SYN. Oncorrhynchus.* *ORD. Scrophularineæ.* A genus comprising about twenty-three species of hardy, annual, North American herbs, now regarded, by Bentham and Hooker, as synonymous with *Orthocarpus*. Flowers yellow or purplish, solitary in the axils of the bracts, disposed in terminal spikes; corolla with a conspicuously trisaccate lip very much larger than the slender, straight galea. Leaves alternate or nearly opposite. *T. versicolor*, the only species introduced, requires ordinary treatment.

**T. versicolor** (various-coloured). *fl.* cream-coloured, changing to rose-purple; lip of the corolla not more than a quarter the length of the densely pubescent tube. June. *l.* incised at apex; segments few, linear-setaceous. *h.* 9in. or more. 1837. Plant fastigiate much-branched. The proper name of this annual is *Orthocarpus erianthus roseus*.

**TRIPINNATE.** When the leaflets of a bipinnate leaf are themselves pinnate.

**TRIPLADENIA.** A synonym of *Kreysigia* (which see).

**TRIPLARIS** (from *triplex*, triple; the parts of the fructification are disposed in threes). *SYN. Velasquezia.* *ORD. Polygonaceæ.* A genus comprising not more than ten distinct species of stove trees, broadly dispersed over tropical South America. Flowers diœcious, sessile or nearly so within the bracts, disposed in long, softly or silky-pilose, simple or often branched spikes; perianth six-cleft, the male funnel-shaped, the female narrow. Nut prominently and rather acutely trigonal. Leaves alternate, shortly petiolate, often ample, ovate, oblong, or lanceolate. *T. americana* has been introduced, but it is a doubtful species, and is probably lost to cultivation.

**TRIPLE-NERVED, TRIPLE-RIBBED.** When of three ribs the two lateral ones emerge from the middle one a little above its base.

**TRIPLET LILY.** See *Triteleia*.

**TRIPLEURA.** A synonym of *Zeuxine* (which see).

**TRIPLO.** Thrice.

**TRIPOLIUM.** Included under *Aster*.

**TRIPOLY.** See *Aster Tripolium*.

**TRIPSACUM** (from *tribo*, *tripeo*, to thresh; alluding to the purpose to which the grain may be applied). *ORD. Gramineæ.* A genus consisting of two species of rather tall, greenhouse or hardy Grasses, inhabiting America, from Mexico to Texas. Spikelets unisexual, monœcious, often two or three, rarely four, many or only one at the tips of the spike, the upper part of which is male, the lower female; glumes four; peduncles solitary or twin in the upper axils. Leaves long, subulate-acuminate. The species are valuable fodder-plants in their native places, but are too tender for our climate.

**TRIPTEROSPERMUM.** A synonym of *Crawfurdia* (which see).

**TRIPTERYGIUM** (from *treis*, three, and *pterygion*, a small wing; referring to the fruit). *ORD. Celastrineæ.* A monotypic genus. The species is a highly glabrous, hardy, sub-scandent shrub. For culture, see *Celastrus*.

**T. Wilfordii** (Wilford's). *fl.* white, small; calyx five-lobed; petals five, inserted at the base of the disk; stamens five, on the margin of the disk, the filaments subulate; disk broadly cup-shaped; racemes short, axillary and terminal. June. *fr.* 4in. long, dry, indehiscent, three-winged, one-seeded. *l.* alternate, petiolate, ovate-oblong, attenuated at apex, serrated, thickly veined, exstipulate. *h.* 2ft. to 3ft. Japan, Formosa, and Corea, 1867. (*R. G.* 612.)

**TRIPTILION** (from *treis*, three, and *ptilon*, a wing; alluding to the three divisions of the pappus). *ORD. Compositæ.* A genus embracing about half-a-dozen species of hardy or half-hardy, annual or perennial, Chilian herbs. Flower-heads blue or white, rather small, homogamous, forming a leafy panicle or corymb at the tips of the branches; florets bilabiate, the outer lip entire or three-toothed, the inner entire or bifid; involucre bracts few, very acute and spinescent, the outer ones shorter; receptacle naked or bristly-fimbriiferous; achenes minutely papillose. Leaves alternate, scattered, ciliated or spiny-toothed or pinnatifid. Two species have been introduced. Seeds should be sown, on a slight hotbed, in the beginning of April. The seedlings may be pricked out, and either planted out in a sheltered place, at the end of May, or flowered in pots, in a cool, airy greenhouse. A rich, light soil is necessary. *T. spinosum* may also be increased by divisions.

**T. cordifolium** (cordate-leaved). *fl.* heads white, sub-ternately clustered at the tips of the branches and branchlets; pappus bristles three, ciliated at apex. July. *l.* sessile, cordate-amplexicaul, nearly round, the margins toothed and furnished with distant spines. Stem erect, branched at apex. *h.* 6in. 1824. Annual. (*B. R.* 853.)

**T. spinosum** (spiny). *fl.* heads, outer lips of the florets blue, inner white; involucre glabrous. July. *l.* pinnately lobed; lobes terminated by a spiny mucrone. Stem corymbose at apex. *h.* 6in. 1827. Perennial. (*B.* 224; *B. R.* xxvii. 22; *P. M. B. x.* 269.)

**TRIQUETROUS.** Three-edged; three-cornered.

**TRISECTED.** Cut into three parts.

**TRISETUM** (from *treis*, three, and *seta*, a bristle; alluding to the three awns of the flower). Including *Rostraria* and *Trichæte*. *ORD. Gramineæ.* A genus embracing nearly fifty species of hardy, perennial or rarely annual, tufted Grasses, broadly distributed over temperate and mountainous regions. Spikelets two (rarely three to six) flowered, often shining; glumes membranous, sub-scarious, or the flowering ones hyaline, the two lower ones empty; panicles sometimes densely spike-formed,

**Trisetum**—continued.

ovate or oblong, sometimes lax and effuse. Leaves flat. *T. flavescens*, the British representative of the genus, is particularly useful for agricultural purposes, and forms a portion of all productive meadows. None of the species possess any horticultural interest.

**TRISMERIA**. Included under *Gymnogramme*.

**TRISTAGMA** (from *treis*, three, and *stagma*, a drop; in reference to the three honey-glands). **SYNS.** *Stemmatium*, *Stephania* (of Willdenow), *Stephanolirion*. **ORD.** *Liliaceæ*. A genus comprising only three species of greenhouse, bulbous plants, natives of Chili. Flowers not numerous, in terminal umbels, pedicellate; perianth salver-shaped, with a cylindrical tube, and six sub-equal, spreading lobes; corona of three to six sub-connate or free scales, or wholly deficient; stamens six; involucre bracts two; scape simple, leafless. Leaves radical, few, narrow-linear. Corm sub-globose, tunicated. *T. narcissoides*, the only species introduced, is a pretty and interesting plant, somewhat resembling a *Narcissus*. It thrives in a compost of rich, sandy loam, and does not require much water. Propagation may be effected by seeds, or by offsets.

**T. narcissoides** (*Narcissus*-like). *fl.*, perianth tube dirty white, scarcely  $\frac{1}{2}$  in. long, with six green bands; segments pure white on the face, with a slender, two-nerved, greenish keel; corona bright orange, erect; umbel five or six-flowered; scape slender, terete, purple, above 1 ft. long. September. *l.* about four, erect,  $\frac{1}{2}$  in. high, narrow-linear, glabrous, acuminate. Bulb globose, less than lin. thick, with several brown, membranous tunics. 1875. **SYNS.** *Stemmatium narcissoides*, *Stephanolirion narcissoides*.

**TRISTANIA** (named in honour of Jules M. C. Tristan, 1776-1861, a French botanist). **ORD.** *Myrtaceæ*. This genus embraces about a dozen species of stove or greenhouse trees or tall shrubs: four inhabit the Indian Archipelago, two are natives of New Caledonia, and the rest are Australian. Flowers yellow or white, often rather small, disposed in axillary, pedunculate cymes; calyx five-parted; petals five, spreading; stamens indefinite. Leaves alternate, or approximate at the tips of the branches, somewhat whorled, rarely opposite. The following species are known to cultivation. They are very pretty, greenhouse, Australian plants, thriving in a compost of loam, peat, and sand. Half-ripened cuttings will root freely in sand, under a glass.

**T. conferta** (clustered). Australian Turpentine-tree. *fl.* yellow, in cymes of three to seven, usually on the young wood below the cluster of leaves; peduncle  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, or rarely elongated. July to September. *l.* alternate, crowded at the ends of the branches so as to appear whorled, ovate-lanceolate, acuminate or rarely almost obtuse,  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long. 1805. A tall tree. (R. G. 1188.) **SYN.** *T. macrophylla* (B. R. 1839).

**T. depressa** (flattened). A synonym of *T. suaveolens*.

**T. macrophylla** (large-leaved). A synonym of *T. conferta*.

**T. neriifolia** (Oleander-leaved). Water Gum-tree. *fl.* yellow, in opposite, axillary cymes, but forming usually a terminal corymb, the central shoots not growing out till after flowering. June to September. *l.* opposite, lanceolate, acute, narrowed into a short petiole,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, nerveless except the prominent midrib. 1804. A tall, slender shrub, or small tree, (L. B. C. 157.) **SYNS.** *Melaleuca neriifolia* (B. M. 1058), *M. salicifolia* (A. B. R. 485).

**T. suaveolens** (sweet-scented). *fl.* yellow, usually small, in axillary cymes; common peduncles  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, more or less flattened. August. *l.* alternate, petiolate, ovate-elliptic, ovate-lanceolate, or elliptic-oblong, obtuse or acuminate, more or less distinctly penninerved and reticulated,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long. 1820. Shrub or tree. **SYN.** *T. depressa*.

**TRISTICHOSUS**. In three rows or ranks.

**TRITELEIA** (from *treis*, three, and *teleios*, complete; alluding to the perfect ternary arrangements of the parts of the flower). Triplet Lily. **ORD.** *Liliaceæ*. A genus consisting of about nine species of half-hardy, American, bulbous plants, now included, by Bentham and Hooker, under *Brodiaea*. Stamens affixed in the tube or throat, biseriæte; filaments filiform, all bearing anthers. The species best-known to gardeners are here described;

**Triteleia**—continued.

they are often confused with *Milla*. All thrive in a rich, well-drained soil, in sunny positions. Propagated by offsets, and by seeds. *T. uniflora* is now and then planted amongst short grass; but, although very pretty for a season or two, it does not permanently hold its own under such conditions. It forms a good bulbous plant for pots, flowering profusely in early spring. The flowers open in bright, and remain nearly or quite closed in dull, weather.

**T. aurea** (golden). *fl.*, perianth yellow, five to six lines long, the segments green-striped, oblong-spatulate, slightly spreading; spathe valves two, connate at base; umbels two to six-flowered; scapes one to three, erect,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long. April. *l.* six to eight, filiform,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long. Bulb whitish, tunicated. Monte Video, 1838. (Ref. B. 42.)

**T. conspicua** (conspicuous). A variety of *T. uniflora*.

**T. laxa** (loose).\* Ithuriel's Spear. *fl.*, perianth blue, funnel-shaped,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, the segments lanceolate, acute, erectopatent; spathe valves many; umbels eight to twenty-flowered; scapes fragile, erect, 1 ft. to 1 ft. high. July. *l.* nearly flat, 1 ft. to 1 ft. long, two to four lines broad. Bulb globose,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. thick. California, 1832. (B. R. 1685.)

**T. Leichtlinii** (Leichtlin's). *fl.* slightly fragrant; perianth  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, the tube greenish, cylindrical, twice as long as the oblong, spreading segments, which are pure white on the face, but marked with a distinct, green keel down the back; umbels two or three, each one to three-flowered. January. *l.* about six to a cluster, overtopping the flowers, erect, glabrous, obtuse,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long. Chilean Andes, 1873. **SYN.** *Milla Leichtlinii* (B. M. 6236).

**T. porrifolia** (Leek-leaved).\* *fl.*, perianth whitish-violet, funnel-shaped, nine to ten lines long, the segments lanceolate-spatulate, nearly thrice the length of the tube; spathe valves two, connate at base; umbels four to six-flowered; scape equalling the leaves. July. *l.* four or five,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, one to two lines broad. Bulb ovoid, eight to twelve lines thick. Chili, 1868. **SYN.** *Milla porrifolia* (B. M. 5977; G. C. 1868, p. 990.)



FIG. 106. TRITELEIA UNIFLORA.

**T. uniflora** (one-flowered).\* Spring Starflower. *fl.*, perianth pale lilac,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, the segments lanceolate-spatulate, slightly spreading; pedicels  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; spathe valves

**Triteleia**—continued.

two, 3in. to 1½in. long; scapes one or (in gardens) very rarely two-flowered. April and May. *l.* six to nine, 6in. to 12in. long, ½in. to 1in. broad. Bulb proliferous. Buenos Ayres, 1836. See Fig. 106. (B. R. 1921.) SYN. *Milla uniflora* (B. M. 3327).

**T. n. conspicua** (conspicuous). *fl.* broadly imbricated when expanded, the segments oblong-spathulate; pedicels often longer than in the type. SYN. *T. conspicua* (Ref. B. 43).

**TRITERNATE.** "When a common petiole divides into three secondary petioles, which are each sub-divided into three tertiary petioles, each bearing three leaflets" (Lindley).

**TRITHRINAX** (from *treis*, three, and *thrinax*, a fan; alluding to the division and form of the leaves). ORD. *Palme*. A small genus (two or three species) of stove, unarmed Palms, natives of Brazil, and one Chilian. Flowers small, hermaphrodite; spathes many, the lower ones inserted on the peduncle, oblong, obliquely cut, the upper ones obliquely truncate; spadices spreading, on thick peduncles, with flexuous branches. Fruit baccate, one-seeded. Leaves terminal, orbicular-ovate, flabellately multifid, glabrous; sheaths fibrous and spiny, erect or deflexed. For culture, see **Thrinax**.

**T. acanthocoma** (spine-covered). *fl.* spadix branched. *l.* large, flabelliform, cut two-thirds of the way down into numerous linear, bifid segments. Caudex dwarf, clothed with the persistent, netted sheaths, armed with numerous, stout, reflexed spines. Rio Grande, 1879. (R. G. 959; G. C. n. s., ix., p. 661.)

**T. aculeata** (prickly). A synonym of *Acanthorhiza aculeata*.

**T. brasiliensis** (Brazilian). *fl.* spadix within the upper leaves, much branched. *l.* large, 3ft. or more long, flabelliform, nearly orbicular; sheaths at the base composed of fibres, which are at first parallel and longitudinal, then obliquely interlaced, and finally plaited together at right angles like the pandanus mats in which coffee is sent from the Antilles and Bourbon; at the summit these stripes unite, forming a series of very long, stout spines, abruptly curved downwards. Caudex slender, 6ft. to 10ft. high, 2in. to 3in. thick. Brazil, 1875. (I. H. 203.)

**T. mauritiiformis** (Mauritia-like). A synonym of *Sabal mauritiiformis*.

**TRITICUM** (the old Latin name for Wheat, probably derived from *tritum*, crushed or ground). Wheat; Wheat Grass. Including *Egilops*. ORD. *Gramineæ*. A genus comprising scarcely half a score species of hardy, annual or biennial, erect Grasses, natives of the Mediterranean region and Western Asia. Spikelets two to five-flowered, distichously spicate, sessile, slightly compressed; glumes rigid, the two lower ones empty; spikes terminal, cylindrical or elongated; rachis flexuous, alternately excavated, continuous or rarely articulated. Grain ovoid or oblong, often villous at apex. Leaves flat. The plants formerly included in British Floras under this genus—viz., *T. caninum*, *T. junceum*, and *T. repens* (Creeping Couch or Cooch Grass), the last-named being only too well known—are now referred to *Agropyrum*, the specific names being the same in both genera. To *T. vulgare*, may be referred nearly all the varieties of Wheat, a grain well known to every one.

**T. æstivum** (summer). A form of *T. vulgare*.

**T. hybernium** (winter). A form of *T. vulgare*.

**T. vulgare** (common). Wheat. *fl.* awned or muticous; spikelets usually four-flowered; valves ventricose, ovate, truncate, mucronate; spikes tetragonal, imbricated, the rachis tenacious. Grain free. *h.* 3ft. *T. æstivum* and *T. hybernium* are mere forms of this, and *T. dicoccum*, *T. monococcum*, and *T. Spelta* (Spelt) are very nearly allied.

**TRITOMA.** A synonym of **Kniphofia** (which see).

**TRITOMANTHE.** A synonym of **Kniphofia** (which see).

**TRITOMIUM.** A synonym of **Kniphofia** (which see).

**TRITONIA** (from *triton*, a weathercock; alluding to the variable direction of the stamens in different species). SYN. *Aletris*, *Waiteia* (of Reichenbach). Including *Montbretia*. ORD. *Iridæ*. A genus including about two dozen species of cool greenhouse or hardy, bulbous plants, indigenous to South Africa. Flower one in a spathe, sessile;

**Tritonia**—continued.

perianth tube slender, straight, sometimes very short, sometimes elongated, rarely loosely incurved at apex; limb concave or broadly campanulate, nearly regular or slightly oblique, the lobes broad, all similar, or the three lower ones thickened or marked with a spot at the base, or sometimes slightly smaller; stamens affixed to the base of the limb; filaments filiform, free; spathes at the sides of the peduncle or on a few scattered branches, short, membranous, often three-toothed. Leaves few, narrow-linear or broader and ensiform, often falcate. Stem simple or slightly branched. The most important garden species are here described. All thrive in the cool greenhouse, except where otherwise indicated. The hardy species like a well-drained, sunny border, and luxuriate in a fairly dry, rich soil. Some of the greenhouse species do well in the open air if planted in a sheltered, sunny spot—such as the foot of a south wall; they should, however, be housed during winter. When grown in pots, Tritonias require plenty of water during the period of growth, and a light, airy place close to the glass. When the leaves turn yellow, water should be gradually withheld, and the roots kept dry, or nearly so, until growth recommences. Propagated by division, or by seeds.



FIG. 107. UPPER PORTIONS OF INFLORESCENCE AND LEAF OF *TRITONIA HYALINA*.

**T. aurea** (golden). A synonym of *Crocasmia aurea*.

**T. capensis** (Cape). *fl.* three to five, pale reddish or yellowish-white; perianth tube pale rose, twice as long as the segments; segments unequal, the lower ones red-spotted; spathe unequal-valved, straw-colour; scape 1½ft. high, branched or simple, terete, flexuous at apex. September. *l.* linear-ensiform, nerved, attenuated, long-sheathing at base, shorter than the scape. 1811. (B. M. 618, 1531.) SYN. *Montbretia capensis*.

**T. orispa** (curled). *fl.* four to eleven, secund; perianth yellowish-white, funnel-shaped, the tube thrice as long as the segments; segments irregular, the upper ones slightly gaping, oblong-ovate, obtuse, unguiculate, flat, the lower ones narrower, obtuse, ligulate, slightly ventricose, connivent, purple-spotted in the middle; scape 6in. to 10in. long, terete, six-leaved, flexuous. April. *l.* broadly lanceolate-ensiform, undulate-crisped, margined with minute bristles. 1787. (B. M. 678.) SYN. *Gladiolus crispus* (A. B. R. 142).

**T. crocata** (saffron-coloured).\* *fl.* seven to nine, distichous; perianth saffron-coloured, campanulate, 1in. long, the tube equalling the spathe, sub-erect, the segments sub-equal, obovate, byaline-fenestrate at base; scape terete, flexuous, leafy at base, nearly 2ft. long. June. *l.* broadly linear-ensiform, curved, striated, acute, shorter than the scape. 1758. SYN. *Ixia crocata* (B. M. 184).

**T. crocosmiflora** (Crocasmia-flowered).\* *fl.*, perianth about 1½in. long, funnel-shaped, with a slender, curved tube, and a spreading, six-parted, orange-scarlet limb; panicle many-flowered, erect, bent in a zigzag fashion. A handsome, hardy hybrid, raised between *T. Pottsi* and *Crocasmia aurea*. (F. M. n. s. 472; R. H. 1882, p. 124.)

**T. deusta** (copper-coloured). *fl.* five to ten, spicate, secund; perianth cinnamon-red, 1in. long, campanulate-infundibular, the tube short, erect; segments broadly ovate, the three inner ones carinate and spotted beneath with dark purple; spathe scarious; scape terete, flexuous, 6in. to 12in. long. May. *l.* broadly lanceolate-ensiform, acute, shorter than the scape, sheathing at base. (B. M. 622.) SYN. *Ixia crocata nigro-maculata* (A. B. R. 134).



**Tritonia**—continued.

**T. fenestrata** (window-like). A synonym of *T. hyalina*.

**T. flava** (yellow). *fl.* three or four, secund, irregularly funnel-shaped; perianth yellow, lin. long, the tube cylindric, erect, enlarged; segments ovate, acute, the lower ones narrower; scape 6in. to 9in. long, terete, leafy at base. February. *l.* lanceolate-ensiform, acute, curved, sheathing at base, shorter than the scape, two lines broad. 1780. (B. R. 747.) SYN. *Montbretia flava*.

**T. hyalina** (hyaline). *fl.* seven to nine, spicate, distichous; perianth rose-colour, lin. long, the tube short and erect; segments regularly spreading, rounded and unguiculate at apex; scape terete, 1ft. long, curved above, leafy at base. May. *l.* broadly lanceolate-ensiform, acute, thickly striated. 1801. See Fig. 107. SYN. *T. fenestrata* (B. M. 704).

**T. lineata** (lined). *fl.* two to seven, spicate; perianth straw-colour, veined, with orange spots, lin. long, the tube short and sub-erect; segments sub-equal, elliptic, the lateral ones retuse, the inner ones marked with three parallel, yellow lines; scape 8in. to 16in. long, terete, erect, curved at apex, leafy at base. May. *l.* lanceolate-ensiform, acute, white-ribbed and margined. 1774. SYNS. *Gladiolus lineatus* (B. M. 487), *Montbretia lineata*.

**T. miniata** (scarlet).\* *fl.* two to fourteen, secund or distichous; perianth scarlet, spreading-infundibular, 3in. to lin. long, with a short, erect, enlarged tube, and nearly regular, ovate segments; scape terete, 9in. to 12in. long, erect, curved at apex, six to eight-leaved at base. August. *l.* broadly lanceolate-ensiform, long-acuminate, yellow-striated. 1795. (B. M. 609.)

**T. Pottsi** (Potts').\* *fl.*, perianth bright yellow, flushed on the outside with brick-red, about lin. long, funnel-shaped, the sub-equal, oblong-obtuse segments about half as long as the tube, which is cylindrical at the base, dilated suddenly at the middle;



FIG. 108. TRITONIA POTTSII, showing Habit and detached Flower.

spikes 6in. to 9in. long, equilateral, 2in. broad when expanded, twelve to twenty-flowered. August. *l.* about four in a distichous rosette at the base of the stem, linear-ensiform, 1½ft. to 2ft. long, ¼in. to ¾in. broad. Stem 5ft. to 4ft. long. Bulb globose. 1877. A very valuable and ornamental, hardy plant. See Fig. 108. (B. M. 6722.) SYN. *Montbretia Pottsi* (Gn. 1880, p. 84).

**T. scillaris** (Squill-like). *fl.* scentless; perianth reddish, varying to white; perianth segments regularly and equidistantly disposed; tube capillary, twice or thrice as long as the spathe. May. *l.* narrow, Grass-like. SYNS. *Ixia polystachya* (B. M. 629), *I. p. incarnata* (A. B. R. 128), *I. reflexa* (A. B. R. 14).

**T. securigera** (hatchet-bearing). *fl.* spicate, secund; perianth brown, lin. long, with an erect, enlarged tube, and equal, ovate, obtuse segments; scape terete, nearly 1ft. long, curved at apex, leafy at base. May. *l.* lanceolate-ensiform, flat, acute, striated, shorter than the scape, sheathing at base. 1774. SYN. *Gladiolus securiger* (B. M. 383).

**T. squalida** (squalid). *fl.* distichous, infundibular-campanulate; perianth whitish-rose, lin. long, with a short, erect tube, and equal, rounded-ovate, unguiculate segments; scape erect, simple, 2ft. high, leafy at base. May. *l.* lanceolate-ensiform, thick, yellow-ribbed and margined, acute. 1774. (B. M. 581.)

**Tritonia**—continued.

**T. undulata** (wavy). *fl.* three or four, scentless; perianth red (said to vary through white and blue), the segments obovate, blunt, spreading; spathe membranous. June. *l.* six, linear, elegantly waved, half the length of the scape. Bulb somewhat oblong, attenuated upwards. *h.* 1ft. 1787. SYN. *Ixia crispata* (B. M. 595).

**T. viridis** (green). *fl.* four to seven; perianth green, the tube twice as long as the segments, somewhat arcuate-reflexed, the segments linear-oblong, sub-equal, obliquely nodding, rotate-reflexed; scape triquetrous, nearly 1ft. long, dichotomous, flexuous at apex. July. *l.* flabelloid-distichous, wavy-crisped on the margins, acute, shorter than the scape. 1788. (B. M. 1275.)

**T. Wilsoni** (Wilson's). *fl.*, perianth white, flushed with purple, the obovate, cuspidate segments twice as long as the tube; spikes simple or forked, lax, four to seven-flowered; scape 2ft. long below the spikes. *l.* five or six, narrow-linear, 1ft. to 1½ft. long, nearly quadrangular in section. 1886. Greenhouse.

**TRIUMFETTA** (named after Giov. Batt. Trionfetti, 1658-1708, an Italian botanist and author). Jamaican Paroquet-Bur. ORD. *Tiliaceæ*. A genus comprising about forty species of widely-dispersed, stove or greenhouse, stellate-pubescent herbs, sub-shrubs, or shrubs. Flowers yellow, axillary or leaf-opposed; sepals and petals five; stamens numerous. Leaves entire, or three to five-lobed, serrated. Several of the species have been introduced; but none of them are worth cultivating for ornament.

**TRIURIDÆE**. A natural order of very slender, white or discoloured herbs, inhabiting tropical forests of Asia and America. Flowers minute, racemose or spicate, monœcious or diœcious, rarely unisexual; pedicels bracteate; perianth three, four, six, or eight-parted, hyaline; segments connate at base, valvate, the tips often caudate; stamens few, various in number, sessile in the base of the perianth; anthers four-celled, two-valved. Carpels many; ripe ones obovoid, coriaceous and indehiscent, or two-valved, one-seeded. Leaves wanting, or bract-like, alternate, and nerveless. Stem simple, rarely divided, filiform, straight or flexuous, erect. The order comprises only a couple of genera—*Sciaphila* and *Triuris*—and about sixteen species.

**TRIXAGO** (of Mœnch). A synonym of **Stachys** (which see).

**TRIXIS** (from *trixos*, triple; alluding to the three-celled, triangular capsule). SYNS. *Castra*, *Perdicium* (in part). ORD. *Compositæ*. A genus embracing about thirty species of stove or greenhouse herbs or shrubs, of variable habit, natives of Central and South America and the West Indies. Flower-heads yellow or whitish; florets bilabiate, the outer lip three-toothed, the inner bipartite or bifid;

involucral bracts often two-seriate; receptacle small; pappus bristles copious. Leaves alternate, sometimes decurrent. The two members of the genus which have been introduced are described below. Both thrive in a compost of sandy loam and leaf mould. *T. divaricata auriculata* requires the protection of a warm greenhouse in winter; it may be increased by cuttings, inserted in sand, under a bell glass, in May. Seeds of *T. senecioides* should be sown in the open ground, in April.

**T. auriculata** (eared). A synonym of *T. divaricata auriculata*.

**T. divaricata auriculata** (divaricate, eared). *fl.* heads white or yellowish-white; involucral scales acuminate. August and September. *l.* sessile, oval-lanceolate, acuminate, denticulate, nearly glabrous, dilated at base into obtuse auricles. Stems climbing, suffruticose. *h.* 1½ft. Brazil, 1827. (B. M. 2765, under name of *T. auriculata*.)

**T. senecioides** (Senecio-like). *fl.* heads white, solitary, on long peduncles; involucral scales in two or three series. August and September. *l.* all sessile and amplexicaul, oblong, sinuate-lobed,

**Trixis**—continued.

toothed, pilose-glandular above, slightly woolly beneath. Stems branched from the base, panicled, pubescent and pilose-glandular. *h.* 1ft. Chili, 1821. Annual. (H. E. F. 101.)

**TRIXIS** (of Gartner). A synonym of **Proserpinaca** (which see).

**TRIZEUXIS** (from *treis*, three, and *zeuxis*, a union; alluding to the cohesion of the three sepals). ORD. *Orchideæ*. A monotypic genus. The species is a small, stove, epiphytal Orchid, of no great beauty, but remarkable in having the lip superior, *i.e.*, with the parts of the flower in their proper position, the ovary not being twisted as in the generality of Orchids. The plant will succeed if fastened to a piece of wood. It may be multiplied by divisions.

**T. falcata** (sickle-leaved). *fl.* green, minute, densely racemose along the branches of the slender scape, which is 6in. to 12in. high. *l.* distichous-rosulate, oblong-linear, acuminate, slightly falcate, 3in. to 6in. long, ½in. broad. Columbian Andes and Trinidad, 1820. (H. E. F. 126; L. B. C. 975; L. C. B. 2.)

**TROCHETIA** (named in honour of R. I. G. du Trochet, 1771-1847, a French physiologist and writer on botany). ORD. *Sterculiaceæ*. A genus comprising about half-a-dozen species of stove or greenhouse, evergreen shrubs or trees, natives of Mauritius, St. Helena, and Madagascar. Flowers rather large, often pendulous; calyx five-parted, coriaceous; petals five, flat, broad, persistent; staminal column short, bearing five ligulate staminodes; bracteoles none, or minute and deciduous; peduncles axillary, one to three-flowered. Leaves entire, coriaceous. Two species have been introduced. They thrive in a compost of well-drained loam, leaf mould, and sand. Cuttings will root in sand, under a glass.

**T. erythroxylon** (red-wooded). The correct name of plant described in this work as *Methania erythroxylon*.

**T. grandiflora** (large-flowered). A synonym of *T. triflora*.

**T. triflora** (three-flowered). *fl.* white and yellow; sepals acuminate, 1in. long; petals obovate, ½in. long; staminal column cylindrical; peduncles much deflexed, exceeding the petioles, three-flowered. December. *l.* oblong, crowded near the ends of the branches, 4in. to 6in. long, acute, sub-entire or dentate, broadly rounded at base, coriaceous, brown-tomentose beneath; petioles erect, 1in. to 2in. long, *h.* 10ft. Mauritius, 1842. Stove. (B. R. 1844, 21, under name of *T. grandiflora*.)

**TROCHISCANTHES** (from *trochiskos*, a small wheel, and *anthos*, a flower; in allusion to the form of the umbels). ORD. *Umbellifereæ*. A monotypic genus. The species is a tall, hardy, perennial herb, with small, white, polygamous, umbellate flowers, and ample or ternately compound radical or lower leaves. It is a native of the South of France and the Alps, and has no horticultural value.

**TROCHLEATE**. Twisted like a pulley.

**TROCHOCARPA** (from *trochos*, a wheel, and *karpas*, fruit; alluding to the radiated arrangement of the cells of the fruit). SYN. *Decaspora*. ORD. *Epacridææ*. A genus including half-a-dozen species of greenhouse, erect or diffuse shrubs or small trees, limited to Australia. Flowers spicate, each sessile within the small, subtending bract and two bracteoles; calyx five-parted; corolla tube cylindrical or campanulate, glabrous or with reflexed hairs inside at the top; lobes recurved, usually shorter than the tube; filaments short, filiform. Fruit a globular or depressed drupe, containing ten stones (or fewer by abortion). Leaves usually petiolate, flat or convex. *T. laurina*, the only species yet introduced, is a handsome tree, thriving in sand and fibry peat. Cuttings of the points of young shoots, or stubby, short side shoots getting firm at the base, should be inserted in sand, under a bell glass, and kept close in a frame or pit, at any time during spring or summer. More heat and moisture must be allowed after the flowering period, and an abundance of air and light before the end of the autumn.

**Trochocarpa**—continued.

**T. laurina** (Laurel-like). *fl.* white, small, in terminal, solitary or clustered, interrupted spikes, ½in. to 1in. long. June. *l.* usually clustered at the end of each year's shoots, so as to appear almost whorled, petiolate, broadly oval or elliptic, acuminate, shining, five to seven-nerved on both sides, mostly 1½in. to 2in. long. *h.* 20ft. to 40ft. 1829. (B. M. 3324.)

**TROCHOSTIGMA**. A synonym of **Actinidia** (which see).

**TROLL FLOWER**. An old name for the genus *Trollius*.

**TROLLIUS** (said to be derived from an old German word *trol*, a globe). Globe Flower; Globe Ranunculus. ORD. *Ranunculaceæ*. A genus comprising about nine species of hardy, perennial, erect herbs, inhabiting the temperate and frigid regions of the Northern hemisphere. Flowers yellow or lilac, ample, solitary or few; sepals five or indefinite, regular, petaloid, commonly deciduous; petals five to eight, small, clawed, rarely indefinite, long-linear. Leaves alternate, palmately lobed or dissected. The best-known species are here described. A rather heavy soil and moist situation are most generally suitable, but Globe Flowers succeed well in the front part of mixed borders, and in many other positions where the soil is fairly good. The plants are of very compact and floriferous habit. Propagation may be effected by divisions, which should preferably be made in September; or by seeds. The latter do not usually vegetate until the year after they are sown.



FIG. 109. FLOWERING STEM AND ROOT-LEAF OF *TROLLIUS EUROPEUS*.

**T. acaulis** (stemless). *fl.* golden-yellow, 2in. in diameter; sepals seven, broadly oval, obtuse; petals fourteen, narrow-cuneate, ½in. long, with a very short claw. July. *l.* five-partite, argutely cut. Stem dwarf, leafy above. Western Himalayas, 1841. (B. R. xxix. 32.)

**Trollius**—continued.

**T. altaicus** (Altaian). *fl.* pale orange or yellow, 2 in. in diameter; sepals ten, often fifteen to twenty, broad, obtuse, rarely acute, occasionally crenulate; petals five to fifteen, narrow-linear, obtuse. *l.* much divided, similar to those of *T. europæus*. *h.* 1 ft. to 1½ ft. 1857. (R. G. 188.)

**T. americanus** (American). A synonym of *T. laxus*.

**T. asiaticus** (Asiatic). *fl.* dark yellow; sepals ten, spreading; petals ten, longer than the stamens. May and June. *h.* 1 ft. to 1½ ft. Siberia, 1817. This species closely resembles *T. europæus*, but the stems are usually one-flowered. (B. M. 235; R. G. 403.)

**T. caucasicus** (Caucasian). *fl.* yellow; petals shorter than the stamens. Otherwise this species closely resembles *T. asiaticus*. Caucasus, 1817.

**T. europæus** (European).\* Boits; Common Globe Flower; Golden Ball, &c. *fl.* pale yellow, globose, 1 in. to 1½ in. in diameter; sepals orbicular, concave; petals oblong, equalling the short stamens. June to August. *l.* radical ones petiolate, sub-orbicular, five-partite, the segments cuneate, lobed and cleft; cauline ones smaller, sessile. Stem 6 in. to 2 ft. high, simple, leafy. Arctic Europe (Britain), &c. See Fig. 109. (Sy. En. B. 42.)

**T. laxus** (loose). *fl.* pale greenish-yellow or nearly white, twice the size of the common Buttercup; sepals five or six, spreading; petals fifteen to twenty-five, inconspicuous, much shorter than the stamens. May. *l.* palmately cut. *h.* 6 in. to 9 in. North America, 1805. SYN. *T. americanus* (B. M. 1988; L. B. C. 56).

**T. patulus** (spreading). *fl.* golden-yellow; sepals five, spreading; petals one to five, equalling the stamens. *h.* 5 in. to 12 in. Siberia, 1800.

**TROMOTRICHE**. Included under **Stapelia** (which see).

**TROPEOLEÆ**. Included under *Geraniaceæ*.

**TROPEOLUM** (from *tropaion*, a trophy; the leaves are of the form of a buckler, and the flowers resemble an empty helmet). Golden Nasturtium; Indian Cress; Yellow Larkspur. ORD. *Geraniaceæ*. A genus comprising about thirty-five species of very handsome, twining or rarely diffuse, greenhouse or hardy, South American, annual or perennial herbs. Flowers orange, yellow, or rarely purple or blue, irregular; sepals five, loosely imbricated or sub-valvate, connate at base, the dorsal one produced into a free spur; petals five, or fewer by abortion, loosely perigynous, imbricated, the two upper ones more or less dissimilar to the rest; stamens eight, free, unequal; peduncles axillary, one-flowered. Fruit consisting of indehiscent, hardened-fleshy, wrinkled, one-seeded carpels. Leaves alternate, peltate or palmately angled, lobed or dissected; stipules wanting, or rarely minute. Tropæolums are mostly familiar twining plants, well adapted for growing in pots or planting out in greenhouses, and training up rafters, &c. They also succeed well outside during summer, but the foliage will not withstand the least frost without injury. For covering arbours, &c., or anything which is unsightly, the tall-growing annuals are not easily surpassed; *T. Lobbianum*, *T. majus*, and *T. peregrinum* are the best for the purpose. The dwarf varieties of *Tropæolum* are beautiful objects for mixed flower borders, and for placing in beds by themselves; they are exceedingly compact and floriferous. The annual species are readily raised from seeds, sown in the open border, in any moderately rich soil, in spring; or, as is best with *T. peregrinum*, they may be sown in pots, under glass, hardened off, and planted out at the end of May or beginning of June. The double varieties are practically perennials, as they must be increased by cuttings, which root readily in bottom heat; during winter, the plants must be kept in a light, airy situation. The tuberous-rooted section, such as *T. azureum* and *T. tricolorum*, thrive in sandy peat and leaf mould, or in turfy loam and peat, and do best under cool-house treatment. They are best grown singly in pots, and each plant trained over a little trellis; when in flower, they are exceedingly pretty and interesting. When growing, they require plenty of light, and abundance of water; when the stems die down, the pots should be stored away in some dry, cool spot, and water withheld until growth recommences, when the tubers must

**Tropæolum**—continued.

be carefully shaken out and repotted; this section may be increased from seeds, or by means of cuttings of the slender, wiry shoots, which callus and form small tubers in one season. *T. speciosum* requires a constantly moist and shaded position in a peat border, and is impatient of disturbance at the roots; it is propagated either from seeds, or by division of the long-creeping, underground rhizomes. *T. polyphyllum* likes a warm, sunny spot, rather dry than otherwise. Tropæolums do not require a very rich soil; they flower more profusely if not encouraged to grow over-luxuriantly.

Except where otherwise stated, the under-mentioned species are perennial twiners.

**T. aduncum** (hooked). A synonym of *T. peregrinum*.

**T. albiflorum** (white-flowered). *fl.*, petals whitish, within lined and dotted with gold and purple, large, plicate, undulated, the lower ones very long- and narrowly-unguiculate. Summer. *l.* small, glaucous, digitate; segments three to five. Stems very slender, elongated. Peru or Chili. Greenhouse. (F. d. S. 241.)

**T. azureum** (azure-blue).\* *fl.* scarcely odorous; petals azure-blue, equal, obovate, attenuated into a long, greenish-white claw, deeply emarginate at apex. October. *l.* peltate, deeply five-lobed; lobes obovate or obversely lanceolate, the middle one larger and mucronate. Chili, 1842. Greenhouse. (B. R. xviii. 65; F. d. S. May, 1846; P. M. B. ix. 247.) *grandiflorum* is a large-flowered form. (F. d. S. 1160; I. H. iii. 85.)

**T. azureum** (azure-blue), of Hooker. A synonym of *T. violæ-folium*.

**T. Beuthii** (Beuth's). *fl.*, calyx segments apiculate, equalling the straight spur; petals yellow; peduncles filiform, twice as long as the leaves. June. *l.* sub-orbicular, deeply peltately cut, pale green beneath; leaflets five or six, obovate, the front one larger, retuse-apiculate at apex. Root tuberous. Bolivia, 1850. Half-hardy.

**T. brachyceras** (short-horned). *fl.*, calyx segments obtuse; spur very short, obtuse; petals yellow, conformed. June. *l.* peltately cut; segments six or seven, oblong-obovate, entire, sessile. Root tuberous. Chili, 1830. Half-hardy. (B. M. 3851; B. R. 1926; F. d. S. 368; P. M. B. iv. 55; S. B. F. G. ser. ii. 370.)

**T. chrysanthum** (golden-flowered). *fl.*, petals golden-yellow, the two upper ones cuneate, shorter than the calyx and lined below with orange-red veins, the three lower ones longer, unguiculate, fimbriately plicate. Summer. *l.* peltate, orbicular-triangular, truncate at base, angularly three-lobed at apex, the margins obsoletely repand-crenate. New Grenada, 1874. Greenhouse. (F. d. S. x. 1005; I. H. xix. 102.)

**T. crenatiflorum** (crenate-flowered). *fl.*, petals yellow, obovate, spreading, sub-equal, truncate and somewhat bicornate at apex, the two upper ones lined with blood-colour. June. *l.* peltate, semi-orbicular, five-lobed; lobes obtuse or retuse, mucronulate. Peru, 1844. Greenhouse. (B. M. 4245; F. d. S. 166.)

**T. Deckerianum** (Decker's). *fl.*, calyx pubescent, longer than the straight, scarlet-spur; petals blue, unequal, toothed, fimbriate-ciliated; filaments and anthers blue; style yellow. July. *l.* peltate, triangular, five to seven-lobed, transversely truncate at base. Venezuela, 1848. Greenhouse. (B. H. ii., p. 245; F. d. S. 490; L. & P. F. G. i. 16.)

**T. digitatum** (digitate-leaved). *fl.*, sepals appendiculate at base; petals golden, dentate-ciliated. July. *l.* peltate, five to seven-lobed; lobes rounded, entire. Venezuela, 1850. Hardy annual. (R. G. 1146, bearing name of *T. Gœrtnerianum* on plate, but *T. digitatum* in letter-press.)

**T. edule** (edible). *fl.*, spur acuminate; petals orange and green, sub-conformed, obcordate, equalling the sepals. March. *l.* pseudo-compound, peltate, six-lobed; leaflets or segments oblong-lanceolate, attenuated at both ends, glabrous. Stems terete. Chili, 1841. Half-hardy. (B. 248; P. M. B. ix. 127.)

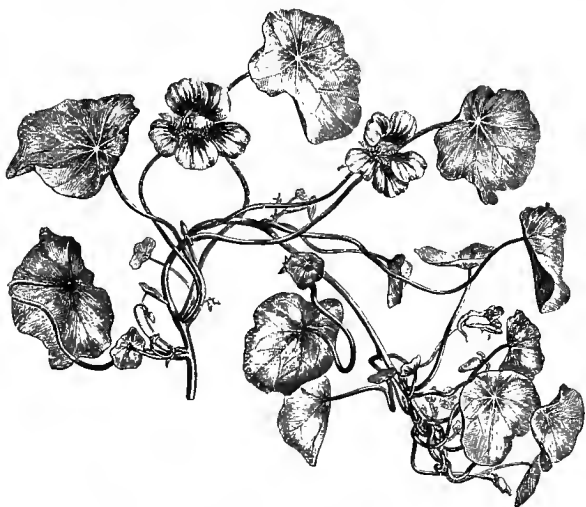
**T. Gœrtnerianum**. See *T. digitatum*.

**T. Jarrattii** (Jarratt's).\* *fl.*, calyx bright orange-scarlet, spotted with yellow at base; petals bright yellow, the two upper ones pencilled with rich brown; pedicels 2½ in. to 3½ in. long. June. *l.* alternate, six or seven-lobed; petioles 1 in. long, slender, twining. Santiago, 1836. Greenhouse. (P. M. B. v. 28.)

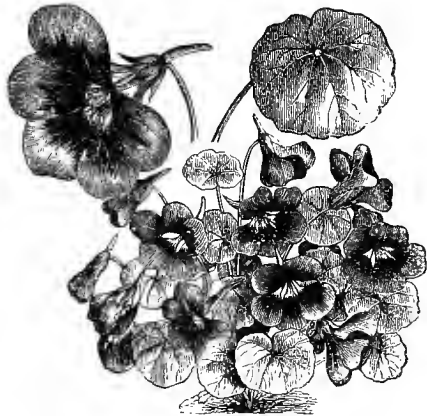
**T. Lobbianum** (Lobb's).\* *fl.*, calyx long-spurred, pilose; petals orange, obovate, the two upper ones entire, scarcely lobed, the three lower ones smaller, deeply toothed, fringed below, long-clawed. November. *l.* peltate-orbicular, obscurely lobed, glaucous beneath; lobes mucronulate; petioles (and peduncles) pilose. Columbia, 1843. Greenhouse. (B. M. 4087; F. d. S. ii. 3; P. M. B. xi. 271.)

**T. l. fimbriatum** (fringed). *fl.*, petals fringed. *l.* lobed. Of hybrid origin. (R. H. 1856, p. 101.)

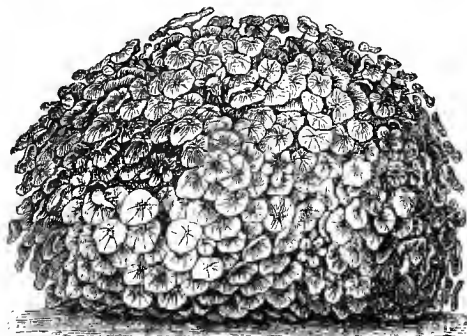
**T. majus** (greatest). Great Indian Cress or Nasturtium. *fl.* rich orange, large and showy, the two upper petals marked with deep reddish-brown, all obtuse; peduncles long. June to October. *l.* alternate, entire, nearly round peltate, sometimes

**Tropeolum**—continued.FIG. 110. PORTION OF FLOWERING STEM OF *TROPEOLUM MAJUS*.

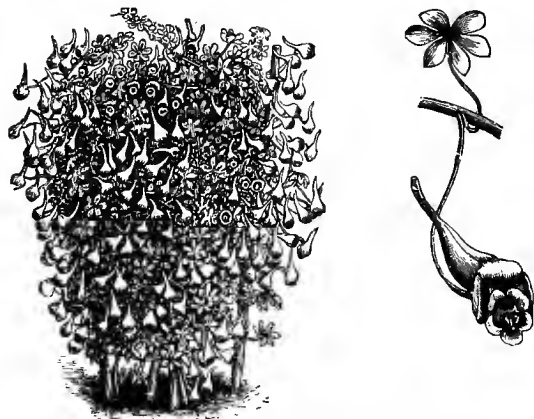
undulated or lobed. Peru, 1686. Hardy annual. The flowers and young leaves are frequently used in salads, and the former also for garnishing. If gathered when young and quite green,

FIG. 111. *TROPEOLUM MAJUS ATROPURPUREUM NANUM*, showing Habit, detached Flower, and Leaf.

the fruits make an agreeable pickle. In certain conditions of atmosphere, the flowers have the power of emitting electric

FIG. 112. *TROPEOLUM MAJUS NANUM COCCINEUM FOLIIS-AUREIS*.**Tropeolum**—continued.

sparks in the evening. See Fig. 110. (B. M. 23.) There are very many varieties of this species, including *atropurpureum nanum* (see Fig. 111; F. d. S. 1286), a dwarf sort, known in gardens as TOM THUMB; *atrosanguineum* (B. M. 3375; P. M. B. i. 176; S. B. F. G. ser. ii. 204), a form with dark blood-coloured flowers; and numerous double-flowered forms of which, perhaps, *GRANDIFLORUM PLENISSIMUM*, double yellow, with a deep maroon blotch at the base of each petal, and *HERMINE GRASHOPP* (Gn. xx. 398), with scarlet flowers, are two of the best. A few of the finest dwarf kinds are: *EMPRESS OF INDIA*, bright crimson; *GOLDEN KING*, golden-yellow; *KING OF TOM THUMBS*, scarlet; *KING THEODORE*, very dark; *PEARL*, creamy-white; *RUBY KING*, rosy-scarlet. A TOM THUMB form, with golden leaves, is represented in Fig. 112.

FIG. 113. *TROPEOLUM TRICOLORUM*, showing Habit and Portion of detached Flowering Stem.

**T. minus** (smallest). Small Indian Cross or Nasturtium. *fl.* deep yellow, streaked with orange and red; petals each ending in a bristle-like point. June to October. *l.* somewhat repand. Peru, 1586. Hardy annual. This resembles *T. majus*, but is much smaller and weaker. The fruits, being smaller, are preferred to those of *T. majus* as a substitute for capers. (B. M. 98.)

**T. Moritzlanum** (Moritz'). *fl.* spur dirty yellow, greenish towards the apex, straight; petals yellow, the upper ones margined and nerved with cinnabar-red, incised-ciliated. July. *l.* peltate, seven-lobed, transversely truncate at base, glabrous; lobes rounded, obsolete mucronate. Caraccas, 1839. Greenhouse. (B. v. 221; B. M. 3844; P. M. B. viii. 199.)

**T. pendulum** (pendulous). *fl.* pendulous; calyx yellow, the spur straight; petals yellow, spatulate, the two upper ones marked with parallel, red lines and a dingy violet spot, the three lower ones self-coloured. July. *l.* peltate, glaucous beneath, rounded-truncate at base; lobes five, the middle one mucronate. Branches terete. Central America, 1852. Greenhouse.

**T. pentaphyllum** (five-leaved). Five-fingered Indian Cross. *fl.* calyx dull purple, 1½ in. long, the limb greenish, marked with deep purple within; petals bright vermilion, small, roundish, sub-unguiculate; peduncles 4 in. long, solitary, axillary. June and July. *l.* about 2 in. across, digitate, of five oblong, entire, petiolulate, soft, glabrous, spreading leaflets; petioles purple, 2 in. long, twisted like tendrils. Stem purple, slender, greatly elongated, slightly twisted, branched. Root a large, oblong tuber. Buenos Ayres, 1829. Half-hardy. (B. M. 3190.) SYN. *Chymocarpus pentaphyllum*.

**T. peregrinum** (exotic).\* Canary-bird Flower; Canary Creeper. *fl.* petals yellow, scarcely longer than the calyx, the two upper ones lobed, mucronate, the three lower ones smaller, fringed; spur hooked, about the length of the upper petals. June to October. *l.* peltate-nerved, somewhat kidney-shaped, five to seven-lobed; lobes entire, mucronate. Peru and Mexico, 1810. Hardy annual or greenhouse perennial. (A. B. R. 597; B. M. 1351; B. R. 718; S. B. F. G. ser. ii. 134.) SYN. *T. aduncum*.

**T. pinnatum** (pinnate-flowered). *fl.* pinnate; petals yellow, wedge-shaped, toothed at the apex. June to November. *l.* somewhat peltate; lobes obtuse, unequal. Hybrid, raised in 1800. Greenhouse. (A. B. R. 535.)

**T. polyphyllum** (many-leaved).\* Yellow Rock Indian Cross. *fl.* calyx with an attenuated spur; petals yellow, longer than the calyx, obovate, the upper ones obovate, sessile, the lateral lower ones emarginate, clawed. June. *l.* leaflets ten to twelve, digitate, fleshy, oblong, entire, the middle one trifid. Chili, 1827. Plant prostrate. Hardy. (B. M. 4042; F. d. S. 2066; G. C. n. s., xx., p. 241; P. M. B. x. 175.)

**Tropæolum**—continued.

**T. sessilifolium** (sessile-leaved). *fl.* on solitary or twin terminal peduncles; calyx with a long spur; petals red, shaded with violet, conformed, spatulate-ovate, emarginate, exceeding the calyx. Summer. *l.* sessile, five-lobed; lobes oblong, glabrous, glaucous. Chili, 1868. Plant prostrate. Greenhouse. (G. C. 1868, p. 842.)

**T. Smithii** (Smith's). *fl.*, spur of the calyx straight, twice as long as the corolla; petals yellow, all lobed and fringed. June. *l.* petate-nerved, deeply palmately five-lobed. New Grenada, 1775. Hardy annual or greenhouse perennial. (B. M. 4385; F. d. S. 384.)

**T. speciosum** (showy).\* Flame-flowered Nasturtium. *fl.*, spur long; petals scarlet, obcordate, exceeding the calyx, the upper ones narrow-cuneate, the lower ones sub-orbicular. June. *l.* sub-peltate, six-lobed; lobes oblong, obtuse, pilose-pubescent beneath. Stems pilose-pubescent. Chili, 1846. Hardy. (B. M. 4323; F. d. S. 281; P. M. B. xiv. 173.)

**T. tricolorum** (three-coloured).\* *fl.* solitary, much shorter than the pedicels; calyx orange-scarlet, tipped with black, turbinate; petals orange, obovate, entire, equal, shorter than the slender, attenuated spur. June to October. *l.* peltate; five or six-parted; segments obovate or oblong, obtuse. Chili, 1828. Half-hardy. A very showy plant. See Fig. 113. (B. M. 3169; B. R. 1935; F. d. S. 369, 1881; P. M. B. ii. 123; S. B. F. G. 270.) There are varieties of this species with yellow and green flowers, viz., *T. t. Regelianum* and *T. t. Schultzei* (R. G. 428).



FIG. 114. PORTION OF FLOWERING STEM OF *TROPÆOLUM TUBEROSUM*.

**T. tuberosum** (tuberous-rooted). Peruvian Nasturtium. *fl.*, petals yellow and red, almost as long as the calyx, entire or toothed. September. *l.* peltate-nerved, five-lobed, transversely truncate at base, smooth. Roots tuberous, depressed, edible when boiled. Peru, 1827. Half-hardy. See Fig. 114. (B. H. ii. 36; B. M. 3714; F. d. S. 452; P. M. B. v. 49; R. H. 1853, 18.)

**T. umbellatum** (umbellate-flowered). *fl.* umbellate; calyx cylindrical, longer than the slightly curved, obtuse spur; petals orange-red, spatulate, straight, acute, three of them exceeding the calyx, the other two minute and scale-like. June. *l.* somewhat peltate, cordate, five-lobed. Quito, 1846. Greenhouse. (B. M. 4337; F. d. S. 302.)

**T. violæfolium** (Viola-leaved). *fl.*, spur short, slightly curved; petals at first of a beautiful azure-blue, becoming paler, spreading, equal, obovate, deeply emarginate at apex, attenuated into long, whitish claws. October. *l.* peltate, deeply five-lobed; segments unequal, obovate or obversely lanceolate, obtuse, the middle one larger, mucronulate. Root tuberous. Chili. Greenhouse. (B. M. 3985, under name of *T. azureum*.)

**T. Wagnerianum** (Wagner's). *fl.*, spur pink, straight, tubular, lin. to 1½ lin. long; petals violet, wedge-shaped, seven-toothed towards the apex; pedicels very slender, about 2½ lin. long. July. *l.* peltate, oblong-triangular, rather obliquely-hastate, truncate at base, acuminate at apex, pale beneath. Venezuela, 1850. Greenhouse. (B. H. ii. 1; F. d. S. 553.)

**TROPHIANTHUS**. A synonym of *Aspasia* (which see).

**TROPHIS** (from *trophe*, fodder; alluding to the use of some of the species). Ramoon-tree. SYN. *Bucephalon*. ORD. *Urticaceæ*. A small genus (five or six species) of stove trees or shrubs, inhabiting the West Indies, Mexico, and the Andes of South America. Flowers sessile or shortly pedicellate; spikes or racemes solitary or twin in the axils, the males loosely bundle-flowered, the females often short and few-flowered. Leaves alternate, petiolate, entire or few-toothed, those of the sterile branches sometimes lobed. The leaves of *T. americana* are said to be occasionally used in the West Indies as fodder. One or two of the species have been introduced, but they are probably lost to cultivation.

**TROPICAL DOCKWEED**. See *Pistia Stratiotes*.

**TROPIDIA** (from *tropis*, *tropidos*, a keel; in allusion to the keel-shaped labellum). SYNS. *Cnemidia*, *Decaisnea*, *Govindovia*, *Ptychochilus*. ORD. *Orchidææ*. A small genus (about five species) of tall, leafy, often branched, stove, terrestrial Orchids, natives of the East Indies, the Malayan Archipelago, and the Pacific Islands. Flowers mediocre, in short spikes; sepals connivent; lip sessile at the base of the column, erect. Leaves ample or reed-like. None of the species are in cultivation in this country.

**TROPIS**. In Greek compounds, this term signifies the keel of a papilionaceous flower or any part resembling it.

**TROS**. Included under *Narcissus*.

**TROTTLERS**. See *Symphytum asperum*.

**TROWEL**. A garden Trowel is a most useful and well-nigh indispensable tool for lifting small plants from one place and inserting them in another, and for planting anything out which has previously been growing in pots, as, for example, during the hedding-out season, when numerous subjects have to be so transferred. Trowels are preferable to dibbers at any time, as with them the holes may be made larger, and the roots spread out better. Fern Trowels are narrower than the ordinary garden kind; as the name implies, they are intended for lifting Ferns, and are chiefly used by collectors of these plants when searching for them in their native habitats.

**TROXIMON** (from *troximos*, edible, which the plants of this genus are not). SYN. *Agoseris*. Including *Ammogeton* and *Macrorhynchus*. ORD. *Compositæ*. A genus comprising about sixteen species of hardy, almost stemless, annual or perennial herbs, natives of North-western and Southern extra-tropical America. Flower-heads yellow or orange, homogamous; florets ligulate, truncately five-toothed at apex; involucre bracts in many series, the outer ones gradually shorter and broader; receptacle flat, naked or foveolate, rarely bearing a few paleæ between the florets; achenes glabrous; pappus bristles copious; scape erect, leafless, one-headed. Leaves radical, entire, deeply toothed, or pinnatifid. *T. glaucum* and its variety are now probably the only known garden representatives of the genus, although others have been introduced. They are perennials, thriving in sandy loam. Propagation may be effected by divisions.

**T. glaucum** (glaucous). *fl.*-heads bright yellow, nearly lin. in diameter; involucre bracts loosely imbricated in three or four series. May and June. *l.* linear-lanceolate, acute, entire, or rarely with one or two small teeth. *h.* 1 ft. United States, 1811. (B. M. 1667.)

**T. g. dasycephalum** (thick-headed). *fl.*-heads, receptacle often bearing a few chaffy scales among the florets; involucre woolly, at least when young. *l.* (and scape) often somewhat pubescent. (B. M. 3462). SYN. *Ammogeton scorzonæefolium*.

**TRUE LOVE**. See *Paris quadrifolia*.

**TRUFFLES**. Fungi, living below ground, or rarely on the surface of the soil. They are, externally, somewhat like potatoes or other tubers; hence, the genus of most importance has been named *Tuber*, and from it

**Truffles**—*continued.*

the order is called *Tuberacei*. The structure of the order is as follows: The exterior is covered with a layer of thickened cells, which incloses a mass of mycelium. In

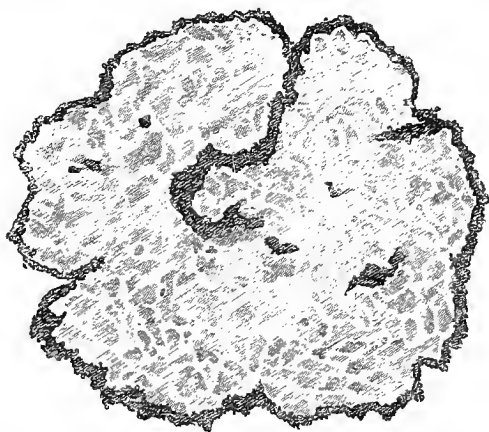


FIG. 115. TUBER.—Section showing dark Surface Layer and Cavities (shaded) in which the Asci and Spores lie.

this may be cavities (see Fig. 115), lined with a layer of cylindrical asci; or the asci may be packed among the cells of the mycelium, without cavities. In each ascus is a definite number of spores (usually four or eight), which are often beautifully marked and ridged, and are usually coloured. The *Tuberacei* thus belong to the division *Ascomycetes*. While young, they are fleshy in texture; but when mature, the interior is filled with a dusty-brown mass of spores, so that, in this stage, they look much like Puff-balls (see *Lycoperdon*), to which, however, they are not nearly related. The term Truffle is sometimes employed to denote a second group of subterranean Fungi, of very similar appearance, named the *Hypogæi*; but in the latter there are no asci, and the spores are produced, singly, on the tips of outgrowths from the ends of large cells (basidia), as in Mushrooms; but the basidia line internal cavities, instead of being exposed on the surface, as in the last-named (which see). It is better to restrict the name Truffles to the *Tuberacei*, or to distinguish the latter as the "true Truffles." They include a considerable number of genera, of which a good many are represented in the South of England; but they become much rarer northwards, and few reach Scotland. The number of species is comparatively small. They vary in size, from about  $\frac{1}{4}$  in. to 3 in. or 4 in. in diameter. The genera are distinguished by the nature and markings of the outer coat (peridium), and by the forms of the asci and spores.

The chief importance of Truffles arises from the fact that several species are highly esteemed as condiments, on account of the flavour that they impart to the food with which they are cooked. The edible Truffles chiefly belong to the genus *Tuber*, *T. aestivum* being almost the only species sold in English markets. In France and other European countries, several other species are also made use of, and are even more highly esteemed. The large White Truffle (*Choiromyces albus*) is sometimes employed, but is inferior to the genus *Tuber*. Owing to their concealed growth, Truffles are very apt to be overlooked; and Truffle-hunters take advantage of the keen sense of smell of dogs, or occasionally of pigs, these animals being trained to hunt over the ground, and to stop over the spots where they scent the Fungi. The plants prefer chalky soils, and there seems to be a connection between the various species and certain trees. For example, *T. aestivum*

**Truffles**—*continued.*

is usually found in the shade of Beeches, though it also grows under Birches, Chestnuts, Hazels, Hornbeams, and Oaks; and *T. macrosporum* and *T. brumale* prefer the shade of Oaks. Attempts have been made to cultivate Truffles, or, rather, to promote their growth in suitable localities. The method found most successful in France is to inclose spaces over chalky soils, and to sow them with acorns. When the Oaks are about twelve years old, Truffles are usually efficiently abundant in the plantation to be worth working; and they continue to be produced for twenty or thirty years. It has been observed on Salisbury Plain that when plantations of Beeches are formed, alone or mixed with Firs, in a few years Truffles are to be found in them, and they continue productive for from ten to fifteen years. Experiments by watering the soil with the washings from sliced Truffles have not given decisive results.

**TRUMPET CREEPER.** A common name for *Tecoma radicans* and other species.

**TRUMPET FLOWER.** A common name for various large trumpet-shaped flowers; e.g., those of *Bignonia*, *Tecoma*, &c.

**TRUMPET HONEYSUCKLE.** A common name for *Lonicera sempervirens* (which see).

**TRUMPET LEAF.** See *Sarracenia*.

**TRUMPET LILY.** See *Richardia africana*.

**TRUMPETS.** A common name for *Sarracenia flava* (which see).

**TRUNCARIA.** A synonym of *Adelobotrys* (which see).

**TRUNCATE.** Terminating very bluntly and abruptly, as if a piece had been broken off.

**TRYMALIUM** (from *trymalia*, a perforation; in reference to the small holes at the top of the capsule). ORD. *Rhamneæ*. A small genus (five species) of Australian, greenhouse shrubs, with the habit and deciduous stipules and bracts of *Pomaderris*, but with smaller flowers and a more slender inflorescence. Calyx limb five-lobed to the base; petals five, hood-shaped, entire or three-lobed, but not usually inclosing the anthers; stamens five, the filaments rather short; panicles usually narrow, or the cymes few-flowered. None of the species are particularly ornamental. *T. Billardieri* is grown in this country. It thrives in sandy loam and leaf mould, and may be increased by cuttings, inserted in a similar compost, under a bell glass.

**T. Billardieri** (Labillardiere's). *f.* numerous, in loose, narrow, terminal panicles 2 in. to 6 in. long. *l.* sometimes broadly ovate or obovate, very obtuse, 1 in. to 2 in. long, sometimes ovate or ovate-lanceolate, more or less acuminate, 2 in. to 3 in. long, entire or crenate, glabrous or pubescent above, white, hoary, or villous beneath. A tall shrub.

**TRYPHENA** (from a Greek proper name). Also written *Triphæna*. A genus of Night-moths, nearly related to *Noctua* (which see) and *Agrotis*; but the species are readily distinguished from those of both genera by the hind wings, which are yellow or orange, with a black band near the hind margin, from which it is separated only by a fringe similar in colour to the area of the wings. There is usually a dark, crescentic mark near the middle of each hind wing. These moths are well known to amateur entomologists as the "Yellow-Underwings." The fore wings are rather narrow, and vary in ground-colour from grey to olive-green or rich umber-brown. Their front margin is sometimes pale; and there are several narrow cross-bars (some paler and others darker than the ground-colour), and two spots near the middle of each wing outlined with grey. There are six British species, varying from 1½ in. to 2½ in. in spread of front wings. They differ, also, in the breadth



**Tryphæna**—continued.

of the black band, and in the depth of colour in the yellow or orange area of the hind wings. The larvæ mostly belong to the group of **Surface Caterpillars** (which see) in general appearance and in habits. The body is smooth and cylindrical, and the head small. The colour varies from dingy ochreous, or dull yellowish-green, to dark brown, with (usually) a paler line down the back, and pale and dark mottlings; but space will not permit of giving minute details.

A very common species is *T. pronuba* (Common Yellow Underwing). The front wings expand to from 2in. to 2½in.; the hind wings are yellow, with the black marginal band rather narrow, and there is no dark spot in their middle. The larvæ of this species feed near the top of the roots of Lettuces, Cabbages, and almost all other kinds of garden vegetables, as well as on many flowering plants. They burrow into the plants, or hide just below the surface of the soil; and when full-fed, in spring, they make earthen cocoons, and become pupæ in the soil. *T. lanthina* (Lesser Broad-bordered Yellow Underwing) has an expanse of wing of about 1½in. The front wings are rich brown, with purple tints, and three wedges of grey extending inwards from the front margin. The hind wings have the base black, and the broad, marginal band intense velvety-black; the crest of each wing is orange. The larvæ feed in Primroses, and in other garden flowers, during winter, and become pupæ, in spring, in cocoons in the soil. *T. interjecta* (Least Yellow Underwing) reaches only about 1½in. in span. The front wings are rusty-brown or dull red, with darker lines, and a smoky band near the hind margin. The hind wings are dark at the base, with a smoky-black marginal band, a similar shade along the inner margin, and a dark spot in the yellow median area. The larvæ feed on low plants, such as Dock and other weeds, in winter and spring, like those already mentioned. *T. fimbria* (Broad-bordered Yellow Underwing) has a spread of wings of 2in. to 2½in. It is easily known by its size, and by the very broad, intensely black marginal band, and the deep orange, unspotted area (extending to the base) of the hind wings. The larvæ feed in autumn on leaves of Birch, Sallow, and other trees, hibernate, and in spring eat the young leaves of the same trees, crawling down the trunk before daylight appears, and hiding in the ground all day, to crawl up again in the evening. *T. orbona* (Lesser Yellow Underwing) varies in spread of wings from 1½in. to 1¾in. The front wings vary in depth of colour. The hind wings are yellowish, clouded with grey at the base, and have a dark grey, crescentic spot in the middle, and a rather narrow, blackish marginal band. The larvæ feed in autumn on Chickweed and other low plants; but, after hibernation, in spring they ascend the stems of Hawthorn and Sallow, and eat the young leaves. *T. subsequa* is too uncommon to call for special mention here.

**Remedies.** These should be employed as recommended against **Noctua** (which see).

**TSIANA.** A synonym of **Costus** (which see).

**TSUGA** (the Japanese name for these trees). **ORD.** *Conifera*. A small genus (eight species) of hardy, ever-green trees, with the ultimate branches slender and often pendulous; three are North American, and two Asiatic. Flowers monœcious; males sub-sessile, solitary in the axils of the upper leaves; female catkins solitary, terminal, globose, with few empty, stipitate scales. Leaves acicular

**Tsuga**—continued.

or narrow-linear, spirally scattered, sometimes distichously spreading, flat or (in one species) convex above. Cones sub-globose, often reflexed, 1in. or less in length, or (in one species) rather longer. The species of this genus are often confused with those of *Abies*. For culture, see **Pinus**.

**T. Brunoniana** (Brown's). *l.* solitary, somewhat distichous or scattered, flat, linear, spreading, obtuse or slightly pointed, minutely toothed towards the apex, reflexed on the margins, glossy-green above, milky-mealy below. *cones* terminal, 1in. long, solitary, sessile. Branches numerous, slender, pendent. *h.* 70ft. to 80ft. Bhotan. (*G. C. n. s.*, xxvi., pp. 73, 501.) **SYNS.** *Abies Brunoniana*, *A. dumosa*.

**T. canadensis** (Canadian).\* Hemlock Spruce. *l.* solitary, flat, irregularly distichous, ½in. to ¾in. long, downy when young, rough at the margins, blunt, vivid light green above, with two

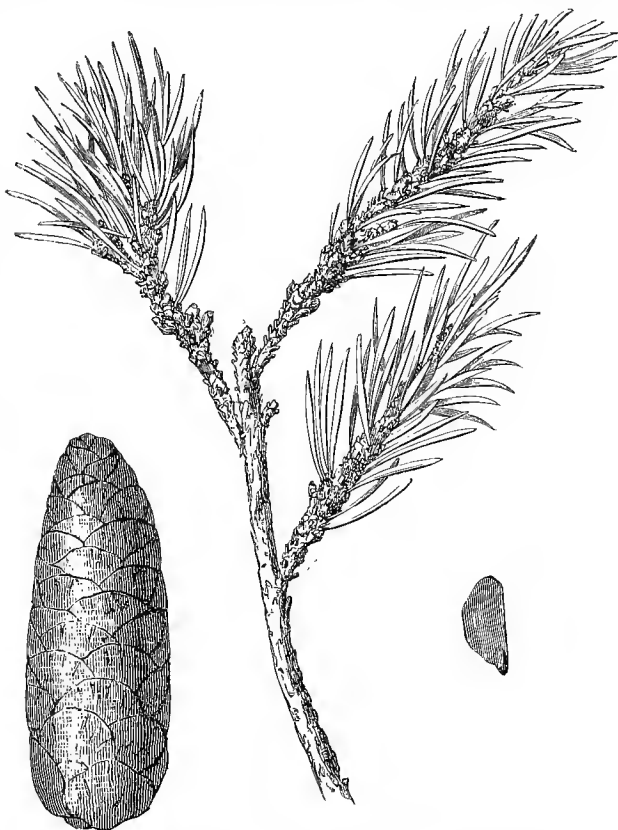


FIG. 116 BRANCH, CONE, AND SEED OF *TSUGA* ROEZZII.

silvery stripes beneath. *cones* pendulous at the tips of the branches, ½in. to ¾in. long, oval. Branches numerous, slender and downy when young, spreading, rather flat. *h.* 60ft. to 80ft. North America, 1736. **SYN.** *Abies canadensis*. The following varieties are enumerated by Gordon, in "The Pinetum":

**T. c. alba-spica** (white-spiked). A rather pretty form, differing from the type in having the leaves on the ends of the young growth of a whitish colour.

**T. c. gracilis** (slender). *l.* linear, blunt-pointed, glossy above, glaucous beneath, more or less obliquely placed all round the shoots, and seldom more than ½in. long. Branches and branchlets very slender, little divided, more or less drooping at the ends.

**T. c. milfordensis** (Milford). A dwarf variety, globular in form, with the shoots slender and drooping, and the leaves much smaller than those of the type; but it is quite distinct from *gracilis*.

**T. c. nana** (dwarf). A dwarf variety, not exceeding 3ft. in height, and spreading on the ground, with a more tufted foliage than the type.

**Tsuga**—continued.

**T. caroliniana** (Carolina). *L.* larger, wider, and darker-coloured than in *T. canadensis*, six to ten lines long, and nearly one line broad, retuse or often notched at the ends. *cones* also larger, ten to sixteen lines long, the scales oblong, longer than wide, spreading when ripe at nearly right angles, the broad bracts slightly cuspidate, the seeds less than half the length of the narrow wing. *h.* 50ft. to 60ft. North Carolina, 1886. A compact, pyramidal tree, with flattened spray. (G. C. n. s., xxvi., p. 781.)

**T. Hookeriana** (Hooker's).\* *L.* closely set, linear, mucronate, and erect, of a pale, slightly glaucous tint. *cones* ovoid-cylindrical, 1½ in. to 2 in. long, ½ in. wide, pendent, dark purple, when ripe pale fawn-coloured; scales coriaceous-imbriated; bracts short, persistent. California, 1854. A very graceful tree, thickly branched, and very distinct.

**T. Mertensiana** (Mertens').\* Very similar to *T. canadensis*, distinguished by its shorter, slenderer leaves, more robust and rapid growth, more spreading branches, and deeper, red-coloured bark; and also by the more elongated scales of its cones and the proportionately longer wings of the seeds. *h.* 100ft. to 150ft. California, 1851. *SYN. Abies Mertensiana.*

**T. Pattoniana** (Patton's).\* Californian Hemlock Spruce. *L.* angular, acutish, attenuate at the base, often curved, ½ in. to 1½ in. long. *cones* cylindrical-oblong, 2 in. to 3½ in. long. Sierra Nevada, 1851. Described by Dr. Engelman as "a tall, strictly pyramidal tree, 100ft. to 150ft. high, and 2ft. to rarely 4ft. through, of graceful habit, with slender, pubescent branchlets, and light green foliage." *SYN. Abies Williamsoni.*

**T. Roezlii** (Roelz'). *L.* scattered, short, slightly twisted, flat above, rounded beneath, green on both surfaces. *cones* about 2 in. long, with large, entire, thin scales; seeds deep red, very small, with a large, membranous wing. Branches pendulous. *h.* 50ft. to 60ft. North California. A curious species, with the habit of *Cedrus Deodara*. See Fig. 116. (R. H. 1870, 21.)

**T. Sieboldii** (Siebold's).\* *L.* solitary, somewhat distichous, thickly set on the branches, frequently alternate, flat, slightly linear, obtuse, rarely acute, entire, dark green above, with two white-glaucous bands beneath. *cones* terminal, 1 in. long, elliptic, blunt. Branches irregularly spreading, drooping at the ends; branchlets slender, recurved. *h.* 80ft. to 100ft. Japan. *SYN. Abies Tsuga.*

**TUBEFORM.** Hollow and dilated at one extremity, like the end of a trumpet.

**TUBE.** The part of a gamosepalous calyx, or gamopetalous corolla, formed by the union of the edges of the sepals or petals. A staminal Tube is formed from the cohesion of the filaments in monadelphous flowers.

**TUBEFLOWER.** A common name for *Clerodendron Siphonanthus* (which see).

**TUBER.** A roundish, underground, succulent stem, covered with buds or "eyes," from which new plants or Tubers are produced; *e.g.*, the Potato. A receptacle of vegetable food.

**TUBER.** See *Truffles*.

**TUBERCLED.** Covered with small warts or excrescences.

**TUBERCULE.** A term applied to simple roots which acquire a succulent consistency, become reservoirs of vegetable food, and serve for propagating purposes, in consequence of being terminated by a bud. A little tuber.

**TUBEROSE.** See *Polianthes tuberosa*.

**TUBER ROOT.** A common name for *Asclepias tuberosa* (which see).

**TUBS.** Wooden Tubs are sometimes used for large plants, such as Palms, Oranges, Tree Ferns, &c. It is important that good drainage should be provided, and porous soil used at first, as the roots cannot be examined very readily afterwards. Trees in Tubs will often remain for several years without the soil being renewed, if watering is properly attended to, and an occasional top-dressing is given.

**TUCKERMANNIA.** A synonym of *Corema* (which see).

**TULBAGHIA** (named after Tulbagh, a Dutch governor at the Cape of Good Hope, who died in 1771). *SYN. Omentaria.* *ORD. Liliaceæ.* About a dozen species have been referred as such to this genus, but Baker

**Tulbaghia**—continued.

accords this rank to nine only. They are mostly greenhouse, rhizomatous, perennial herbs, with a garlic-like odour, inhabiting South and tropical Africa. Flowers numerous, in a terminal umbel, pedicellate; perianth urceolate or nearly salver-shaped, with six sub-equal, spreading lobes; corona rather fleshy at the throat, shorter than the lobes; stamens six; involucre bracts two, scarious, broad; scape simple, leafless. Leaves radical, ligulate, the withered sheath sometimes forming, with the rhizome, an imperfect corm. The species known in gardens are described below. They are interesting subjects when in flower. Sandy loam and peat form the most suitable compost for Tulbaghias. Propagation may be effected by offsets, or by seeds.

**T. affinis** (related). A form of *T. alliacea*.

**T. alliacea** (Onion-scented). *fl.*, perianth greenish-purple, five to six lines long; corona obscurely red, fleshy, entire or crenate; umbels four to twelve-flowered; scapes 9 in. to 18 in. long. June. *l.* five or six, 6 in. to 9 in. long, two to three lines broad. 1820. (Ref. B. 348.)

**T. a. affinis** (related). *fl.*, perianth segments half the length of the tube, narrower. *l.* 1 ft. or more long, three to six lines broad. Altogether a more robust plant than the type. *SYN. T. affinis.*

**T. a. Ludwigiana** (Ludwig's). *fl.*, scape 1½ ft. to 2 ft. long. *l.* lorate, 6 in. to 8 in. long, eight to nine lines broad. *SYN. T. Ludwigiana* (B. M. 3547).

**T. alliacea** (Onion-like), of Sims. A synonym of *T. capensis*.

**T. capensis** (Cape). *fl.*, perianth greenish-purple, the segments half the length of the tube; stamindia obscurely purple, deeply emarginate; umbels six to eight-flowered; scapes 1½ ft. to 2 ft. high. June. *l.* ten to twelve, 1 ft. or more long, four to six lines broad. 1774. (B. M. 806, under name of *T. alliacea*.)

**T. Ludwigiana** (Ludwig's). A form of *T. alliacea*.

**T. violacea** (violet). *fl.*, perianth purplish-violet, eight to nine lines long, the segments lanceolate, half the length of the cylindrical tube; stamindia ligulate, emarginate; umbels eight to twenty-flowered; scapes 1 ft. to 2 ft. long. March. *l.* six to ten, green, 8 in. to 12 in. long, two to three lines broad. 1838. (B. M. 3555.)

**TULIP.** See *Tulipa*.

**TULIPA** (the Italian rendering of the Turkish *tul-bend*, a turban, which the flower resembles). Dalmatian Cap; Tulip. Including *Orithya*. *ORD. Liliaceæ.* A genus comprising, according to Mr. Baker, upwards of sixty species of very beautiful, hardy, bulbous plants, inhabiting Europe, North Africa, Western and Central Asia, and extending as far as Japan. Flowers erect or very rarely nodding, showy; perianth deciduous, campanulate or nearly funnel-shaped; segments distinct, erect or erecto-patent, sub-equal, often spotted inside near the base; stamens six, hypogynous, shorter than the perianth; filaments more or less complanate, attenuated or shortly filiform at apex; anthers oblong-linear, erect, the cells laterally dehiscent. Leaves linear or rather broad. Stem simple, few-leaved, one, or rarely two or three, flowered. Bulb tunicated, the tunics sometimes woolly within. "In the middle of the seventeenth century, Tulips became the object of a trade such as is not to be met with again in the history of commerce, and by which their price rose above that of the most precious metals. It is a mistake, however, to suppose that the high prices paid for bulbs—amounting, in some instances, to 2,500 and even 4,600 florins—represented the estimated value of a root, since these large sums often changed hands without any transfer of property. Bulbs were bought and sold without being seen—without even being in existence. In fact, they were the subject of a speculation not unlike that of railway scrip in this country at no very distant date" (Lindley and Moore). Tulips still take front rank amongst the most familiar and beautiful of hardy, bulbous plants. Many hundreds of varieties have been raised by means of careful hybridisation; and they are mostly offered at prices that place them within the reach of the average amateur gardener.

*Propagation.* New varieties of Tulips are obtained

**Tulipa**—*continued*.

from seeds, and some of the species which increase but slowly by offsets may be similarly raised. The most general method of propagation for perpetuating varieties is that of offsets, which are generally produced in fair quantities. Seeds may be sown in boxes of light, sandy soil, about February, and placed in a cold frame, where they will germinate in due course, and may be protected during the following winter. The next season the young bulbs should be planted in a prepared bed outside, for growing on into a flowering size. This takes four or five years, and the first flowers which appear are usually self-coloured; after another period, the length of which is quite an uncertainty, these flowers, which at the first are called "breeders," break into other colours and markings, which admit of their being placed into one or another of the several classes adopted. The process of raising flowering bulbs of Tulips from seed is, therefore, a very slow one. Offsets may be detached from established bulbs, when they are lifted, and grown by themselves until large enough for flowering. The chief supplies of Tulips are imported from Holland, where, —with other, commonly called, Dutch bulbs—they are grown in immense quantities for exportation to all parts of the world. When young seedlings and offsets are raised in gardens, they should be planted in a border or bed prepared with sandy loam, leaf mould, and light manure, and provided with efficient drainage, which, if possible, should be secured by selecting a position where the subsoil is gravelly. A situation exposed to sun and air is preferable, but sheltered from rough winds, which blow the plants about, and break their leaves.

**Cultivation.** Planting of all kinds of Tulips is best performed in October, and early in November; the bulbs should be placed from 3in. to 4in. deep, to preserve them against injury from severe frost; a little sand round each is generally recommended, but in light, sandy soil this need not be considered absolutely essential—except, perhaps, with scarce sorts or valuable seedlings. Planting with a trowel is best, as the soil is better adapted for the roots to enter than when a dibber is used. A distance of 6in. between the bulbs is sufficient; but when there are not many to be planted they may be more widely disposed. In the spring, so soon as the flowers begin to expand, a light awning placed over the bed will preserve those of any particular variety for a longer period than if they were exposed; but flower-beds filled with Tulips for a spring display cannot receive such attention. The bulbs may be lifted after the foliage turns brown and the stalks become limp, and placed in a cool, airy place, not in the sun. When thoroughly ripened, they may be stored in drawers or bags, where provision can be made for air circulating amongst them, until planting time again arrives. If it becomes necessary to lift the bulbs to clear flower-beds for summer occupants, they should be planted again in reserve beds, and allowed to ripen there.

The arrangement of colours, and the selecting of showy varieties which flower at about the same period, are matters of great importance in planting beds of Tulips. Both single and double kinds succeed admirably, but preference must be accorded the former, which are very distinct and beautiful.

For pot-culture and forcing, Tulips—at least, the early-flowering varieties—are invaluable. So soon as the annual consignments arrive from Holland, the supply for the season should be procured, and a portion potted. From three to five bulbs, according to size, are requisite for a 5in. pot, and a compost of two parts loam to one of light manure, with some sand intermixed, is suitable. Afterwards plunge the pots in ashes or cocoa-nut fibre outside, and introduce into gentle heat when the bulbs are well rooted, and begin to push their shoots. Successional supplies should be similarly treated, according to requirements, and the quantity of bulbs at command.

**Tulipa**—*continued*.

The species here described are those best known in gardens, and are based on Mr. Baker's admirable monograph of the genus, which appeared in the "Gardeners' Chronicle" for 1883. His synopsis of the species, adjusted to the requirements of this work, is given below.

**Sub-genus I. Tulipa proper.**

Ovary with a sessile stigma.

**SECTION 1. ERIOBULBE.** Perianth bright red; filaments without a tuft of hairs at the base. Lower leaf usually oblong-lanceolate. Outer bulb coats densely coated inside with soft, intertangled, cottony hairs.

maleolens  
montana  
Oculus-solis  
præcox

**SECTION 2. CLUSIANÆ** (type, *T. Clusiana*). Flowers mainly white, between funnel-shaped and campanulate; filaments without a tuft of hairs at the base. Leaves narrow and grass-like. Outer bulb coats densely hairy inside.

Clusiana  
stellata

**SECTION 3. GESNERIANÆ** (type, *T. Gesneriana*). Perianth usually bright red, campanulate; filaments without a tuft of hairs at the base. Lower leaf broad, with two or three exceptions. Bulb coats glabrous, or with only a few adpressed hairs inside. This is the largest section of the genus, and the one to which all the species most valuable for garden purposes belong. It may be best divided into groups by characters derived from the shape of the perianth segments and the vestiture of the peduncles:

Group 1. Perianth segments all uniform and acuminate.

acuminata  
elegans  
retroflexa

Group 2. Perianth segments all, or the three outer, oblong, acute; peduncle glabrous.

brachystemon  
cruciatata  
Didieri  
Elwesii  
Kesselringii  
Kolpakowskiana  
triphylla  
undulatifolia

Group 3. Perianth segments all broadly rounded at the apex, with a small cusp in the centre; peduncle glabrous.

Borsczowi  
Gesneriana  
macrosepala  
Ostrowskiana

Group 4. Perianth segments all narrowed to an acute point.

altaica  
Kaufmanniana  
strangulata  
snaveolens

Group 5. Perianth segments all obtuse; peduncle permanently pubescent.

Alberti  
Eichleri  
Greigi  
ilensis  
maculata  
pubescens

**SECTION 4. SAXATILES.** Perianth red or lilac; filaments furnished with a tuft of hairs at the base. These are a little group of fine species, all belonging to the oriental flora, and all, as yet, little known in cultivation.

Aucheriana  
Hageri  
pulchella  
saxatilis

**SECTION 5. SYLVESTRES.** Perianth always yellow or yellowish-white; filaments with a tuft of hairs at the base. The species of this section have been comparatively little cultivated, and are of much less interest from a horticultural point of view than those of any of the foregoing. They may be divided into three groups by the colour of the flower:

Group 1. Flowers bright yellow, flushed with green on the outside.

Biebersteiniana  
fragrans  
Grisebachiana  
sylvestris

**Tulipa**—*continued*.

Group 2. Perianth bright yellow, flushed with red on the outside.

australis  
humilis  
Orphanidea

Group 3. Perianth pale yellow or whitish inside, tinged with green or reddish outside.

biflora  
patens  
primulina  
turkestanica

**Sub-genus II. Orithylla.**

Ovary narrowed gradually into a distinct style, which is tipped with three small stigmas. The species of this sub-genus are all dwarf, small-flowered, fragile plants, of little horticultural interest, natives of Siberia, China, and Japan. They may be arranged in three groups, according to leafage:

Group 1. Leaves two, sub-opposite, placed about the middle of the stem.

nniflora

Group 2. Leaves three, crowded near the base of the stem.

thianschanica

Group 3. Leaves, two large ones low down on the stem, and two to four small ones near each flower.

edulis



FIG. 117. *TULIPA ACUMINATA*, showing Habit and detached Flower.

**T. acuminata** (acuminate). Turkish Tulip. *fl.*, perianth variable in colour, 3in. to 4in. long, the segments all alike, narrowed gradually into a very long point; peduncle glabrous. April. *l.* (and bulb) as in *T. Gesneriana*. Native country unknown. A distinct type. See Fig. 117. *SYN.* *T. cornuta* (B. R. 127).

**T. Alberti** (Albert Regel's). *fl.*, perianth orange-scarlet, the base faintly blotched with red-brown on a yellow groundwork, campanulate, 2in. long, the three inner segments obtuse, the three outer sub-acute; filaments yellow, exceeding the dark purple anthers; peduncle erect, pubescent, 6in. to 9in. long. April. *l.* glaucous-green, lanceolate, without blotches. *h.* 2ft. Central Asia, 1877. (B. M. 6761; R. G. 912.)

**T. altaica** (Altaian). *fl.*, perianth usually yellow, rarely red, 1in. to 1½in. long in wild specimens, the segments oblong and decidedly acute, without any basal blotch; peduncle pubescent, 3in. to 4in. long. April. *l.* usually three, the lowest lanceolate, about 1in. broad. Stem 6in. to 9in. long. Bulb ½in. to 1in. in diameter, the outer tunics without any hairs inside. South-central Siberia. The red-flowered variety is figured in R. G. 942.

**T. Aucheriana** (Aucher Eloy's). *fl.* strongly fragrant; perianth oblong-infundibular, 1in. to 1½in. long, all the segments marvellous, nearly alike, oblong, acute, ½in. broad, with a bright yellow claw; stamens ½in. long, the yellow filaments twice as long as the anthers, densely hairy at base; peduncle slender, glabrous. April. *l.* three or four, linear, glabrous, acute, 4in. to 6in. long, ½in. broad, gradually narrowed from the middle to the base and apex. Stems 4in. to 8in. long, slender, glabrous, one-headed. Bulb ovoid, medium-sized. Teheran, 1880.

**T. australis** (Southern).\* This is distinguished from *T. sylvestris* by its more funnel-shaped perianth, flushed with red on the outside, 1in. to 1½in. long, its narrower leaves, and its more slender habit. Savoy. *SYNS.* *T. Breyniana* (B. M. 717), *T. Celsiana*. *T. humilis* is a dwarf species closely allied to *T. australis*; it is a native of the mountains of Persia.

**T. Biebersteiniana** (Bieberstein's). This resembles *T. sylvestris*, but the perianth is smaller and more funnel-shaped, and the plant is less robust in habit. Asia Minor, Siberia, &c., 1820.

**Tulipa**—*continued*.

**T. biflora** (two-flowered). *fl.*, perianth white inside, with a yellow eye, tinged green outside, oblong, infundibular, the segments oblong, acute; anthers minute. April. *l.* two or three, ½in. to ¾in. broad. Stems 3in. to 6in. long, with often two or three, rarely four or five, flowers. Bulb ovoid, the outer tunics woolly outside. Caucasus, 1806. This is a connecting link between the sub-genus *Orithylla* and the true Tulips. (B. M. 6518; B. R. 535; R. G. 239.)

**T. Bonarotiana** (Bonarotti's). A form of *T. strangulata*.

**T. Borszczowi** (Borszczow's). *fl.*, perianth bright red, 1ft. to 1½ft. long, all the segments obovate-oblong, obtuse, with a cusp at the tip, and furnished with a large, brown-black, basal blotch, margined with yellow, as in *T. Oculus-solis*; peduncle glabrous. Spring. *l.* four, with a distinct, cartilaginous, very crisped border, the lower one lanceolate. Dwarfier than *T. Gesneriana*. Central Asia. (R. G. 1175.) The form figured in B. M. 6635 has the flowers yellow without any basal blotch.



FIG. 118. *TULIPA GESNERIANA*.

**T. brachystemon** (short-stamened). This is very near *T. Kesselringii*, from which it is said to differ by the flower being smaller with more acute segments, and the leaves being narrower and only two in number. Turkestan. (R. G. 1099, fig. 2.)

**T. Breyniana** (Breyn's). A synonym of *T. australis*.

**T. Celsiana** (Cels'). A synonym of *T. australis*.

**T. camptopetala** (flexible-petaled). A form of *T. Didieri*.

**T. Clusiana** (Clusius').\* Lady Tulip. *fl.*, perianth delicate white, flushed with red on the outside, with a conspicuous, purplish-black base, middling-sized; anthers and filaments black. July. *l.* four or five, long-linear, acuminate, channelled. Stem slender, 1ft. to 1½ft. long. Bulb small, densely pilose. Mediterranean region, 1636. (B. M. 1390; S. F. G. 329.)

**T. cornuta** (horned). A synonym of *T. acuminata*.

**Tulipa**—*continued*.

**T. cruciata** (cruciate). *fl.*, perianth bright cherry-red inside, campanulate, 1½ in. to 1½ in. long, the outer segments acute, the inner obtuse, both having a large, black blotch with a yellow border filling up the whole claw; stamens black, ½ in. long; peduncle obscurely glandular-pubescent. Spring. *l.* four or sometimes five, crowded, spreading, linear; lowest 6 in. to 9 in. long, ½ in. broad. Bulb middle-sized, with a long neck. Asia Minor, 1874.

**T. Didieri** (Didier's). *fl.*, perianth bright red, campanulate, 2 in. to 2½ in. long, with a black blotch ½ in. to ¾ in. long, and having a yellow or whitish border covering the whole of the claw; the three outer segments oblong, acute, the three inner ones more obovate and obtuse; stamens blackish-purple, the anthers equaling in length the glabrous filaments. May. Bulb-coats scarcely hairy inside. Stature, leaves, and peduncle, as in *T. Gesneriana*. Alps. (B. M. 6639.) SYN. *T. Fransoniana*.

**T. edulis** (edible). *fl.*, perianth pale yellow, sometimes flushed with red, strongly tinged with green on the outside, funnel-shaped, ½ in. to 1 in. long, all the segments acute. May and June. *l.*, two lower ones linear, flaccid, 6 in. to 12 in. long; two below each flower small, linear, erecto-patent. Stem slender, 3 in. to 9 in. long, one to three-headed. Bulb ovoid, the outer tunics densely woolly inside. Japan.

**T. Eichleri** (Eichler's).\* *fl.*, perianth bright crimson, having a distinct, black blotch spread over the whole claw, with a yellow border; segments obovate, obtuse. April and May. Georgia, 1874. This fine plant closely resembles *T. Gesneriana*, but differs in having a pubescent peduncle. (B. M. 6191; R. G. 799.)

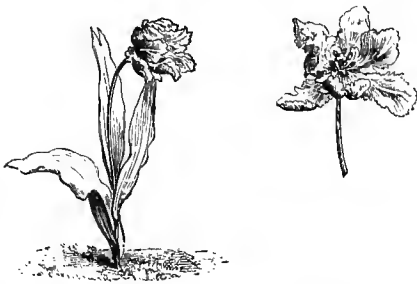


FIG. 119. TULIPA GESNERIANA DRACONTIA, showing Habit and detached Flower.

**T. elegans** (elegant).\* *fl.*, perianth bright red, campanulate, with a yellow eye, the six nearly uniform, oblong segments gradually narrowed to a very acute point; stigma moderately large; peduncle finely downy. End of April. Probably a hybrid between *T. acuminata* and *T. suaveolens*.

**T. Elwesii** (Elwes). *fl.*, perianth bright scarlet, erect, campanulate, 1½ in. long, all the segments having a small, black blotch with a yellow margin filling up the whole claw, the three outer ones oblong, acute, the three inner ones obovate; stamens dark purple; peduncle erect, glabrous. Early in April. *l.* three, rather glaucous, glabrous; lowest lanceolate, 5 in. to 6 in. long, ½ in. to ¾ in. broad, concave down the face above; two upper much smaller, linear. Stem slender, 6 in. to 8 in. long. Bulb ovoid, ½ in. in diameter; tunics dark brown, glabrous inside. Teheran. (R. G. 1147.)

**T. fragrans** (fragrant). A synonym of *T. sylvestris*.

**T. Fransoniana** (Fransen's). A synonym of *T. Didieri*.

**T. fulgens** (brilliant). A form of *T. Gesneriana*.

**T. Gesneriana** (Gesner's).\* *fl.*, perianth large, campanulate, the segments variable in colour, when bright red having only an obscure basal blotch, broadly rounded at the apex; stigmas crisped, ½ in. in diameter; peduncle glabrous, erect. May and June. *l.* (in a wild state) three or four (often more numerous when growing vigorously under cultivation), broad. Bulb large, the outer coats having a few adpressed hairs on the inside. *h.* 2 ft. Levant, &c., 1577. "This is evidently the original stock of most of the late-flowering garden forms" (Baker). See Fig. 118. (B. R. xxiv, 46; F. & P. 537, under name of *T. G. Strangwaysii*.) SYN. *T. Schrenkii* (B. M. 6439). *T. fulgens* is a form having bright scarlet flowers with a yellow eye and yellow stamens. The variable race of Parrot Tulips are referred to *T. G. Dracontia*. See Fig. 119. (F. d. S. 2211, under name of *T. turcica*.)

**T. G. spathulata** (spathulate).\* This differs from the type in its larger flowers, of a brilliant-red colour, with a large, purplish-black blotch at the base of each of the segments. Italy. Probably the largest of all the wild Tulips. SYN. *T. spathulata*. This is catalogued by many bulb-growers as *T. G. vera*.

**T. G. Strangwaysii** (Strangways'). A synonym of *T. Gesneriana*.

**T. G. vera**. See *T. G. spathulata*.

**Tulipa**—*continued*.

An enormous number of garden forms, both double and single, varying most widely in colour, have originated from *T. Gesneriana*. See Figs. 120, 121, 122, and 123.



FIG. 120. FLOWERS OF TULIPA GESNERIANA FLAMANDE.

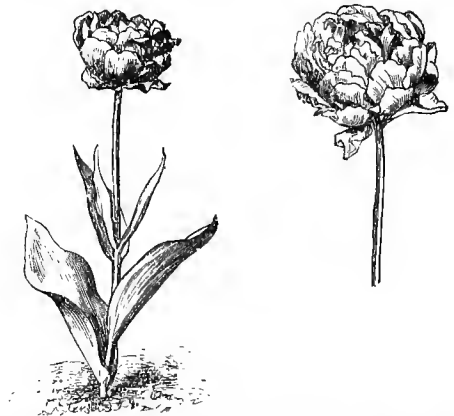


FIG. 121. TULIPA GESNERIANA FLORE-PLENO, showing Habit and detached Flower.

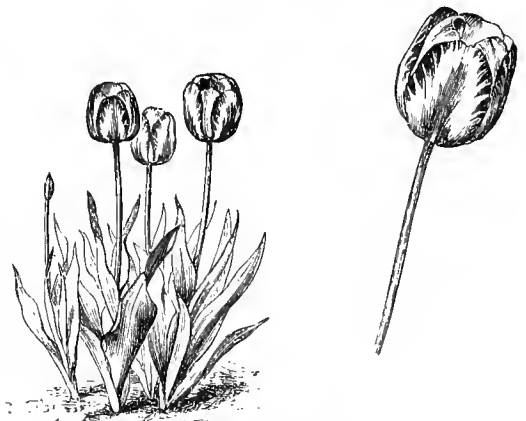


FIG. 122. TULIPA GESNERIANA GRAND PIED, showing Habit and detached Flower.

**T. Greigi** (Greig's).\* *fl.*, perianth bright flame-red, campanulate, 2½ in. to 3 in. long, all the segments very obtuse and furnished with a very distinct, linear-oblong, black blotch, sometimes lin.

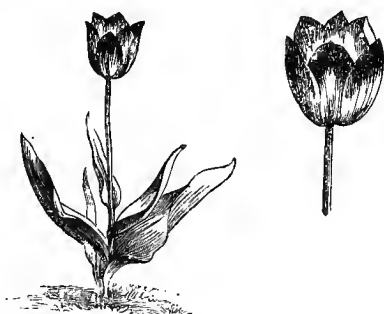
**Tulipa—continued.**

FIG. 123. TULIPA GESNERIANA HABIT, showing Habit and detached Flower.

long, with a yellow border; stigma large; and anthers bright yellow; peduncle pubescent. April. *l.* broad-oblong, glaucous, with numerous distinct, brown blotches. *h.* 9 in. Turkestan, 1873. A showy and robust species. See Fig. 124. (B. M. 6177; F. d. S. 2261; F. & P. 1876, 217; R. G. 773.)

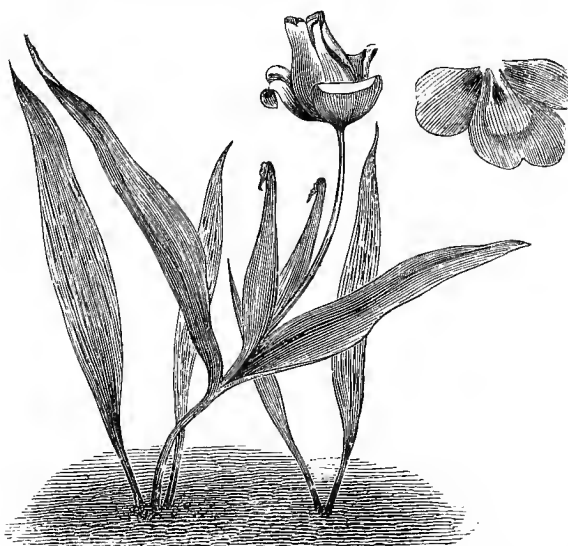


FIG. 124. TULIPA GREIGI, showing Habit and detached Perianth Segments.

**T. Grisebachiana** (Grisebach's). *fl.* faintly scented; perianth of a lemon-yellow colour, less than 2 in. long; peduncle 1 ft. long, one-flowered, glaucous. Spring. *l.* three, very glaucous, erect, 6 in. to 7 in. long,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. broad, concave. Bulb ovoid, the outer tunics brown, glabrous. Herzegovina, 1884. Closely allied to *T. sylvestris*.

**T. Hageri** (Hager's). *fl.*, perianth campanulate,  $\frac{1}{2}$  in. to 2 in. long, the segments bright red, often tinged with yellow outside, oblong, acute,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. broad, furnished with a large, rhomboid, blue-black blotch on the claw, with a yellow border; stamens purplish-black, under  $\frac{1}{2}$  in. long; filaments densely pilose at base; peduncle glabrous, stiffly erect. April. *l.* three or four, linear, green, acute, channelled down the face, the lowest 6 in. to 8 in. long,  $\frac{1}{2}$  in. broad. Stem one-headed, 1 ft. long. Bulb ovoid, middle-sized. Attica, 1874. (B. H. 1877, 2; B. M. 6242; R. G. 790.)

**T. humilis.** See **T. australis**.

**T. iliensis** (Trojan). Cowslip-scented Tulip. *fl.*, perianth lemon-yellow, not more than 1 in. long, all the segments obtuse; stigma minute; filaments twice as long as the yellow anthers; peduncle slender, pilose. Spring. *l.* four, linear, aggregated near the base of the peduncle, all under  $\frac{1}{2}$  in. broad. Bulb small, ovoid, the outer tunics slightly pilose inside. Central Asia, 1879. (B. M. 6518, B; R. G. 975, 982.)

**Tulipa—continued.**

**T. Kaufmanniana** (Kaufmann's). *fl.*, perianth bright yellow, slightly tinted with red outside towards the top, nearly 3 in. long; the segments oblong, acute, without any basal blotch; peduncle erect, downy, 5 in. to 6 in. long. Spring. *l.* three, glaucous; the lowest oblong-lanceolate,  $\frac{1}{2}$  in. to 2 in. broad. Stature of *T. Gesneriana*. Central Asia, 1877. (B. M. 6887; R. G. 906, figs. 6-10.)

**T. K. albo-variegata** (white-variegated). *fl.*, perianth white inside, yellow towards the base, with the back of the three outer segments rose-coloured and white-margined. 1877.

**T. K. luteo-variegata** (yellow-variegated). *fl.*, perianth pale yellow inside, with a red spot below the middle, the three outer segments rose-coloured on the back, with yellow margins. 1877.

**T. Kesselringii** (Kesselring's). *fl.*, perianth bright yellow, oblong,  $\frac{1}{2}$  in. to 2 in. long, the six segments all oblong and sub-acute, the three outer flushed with red down the back; stamens bright yellow; peduncle obscurely pubescent. April. *l.* four, linear, channelled, glabrous, not undulated, the lowest 6 in. long. Dwarfier than *T. Gesneriana*, with a smaller bulb, the outer tunics of which are slightly rugose inside. Turkestan, 1879. (B. M. 6754; R. G. 964.)

**T. Kolpakowskiana** (Kolpakowski's). *fl.*, perianth faintly scented, campanulate, 2 in. to 2  $\frac{1}{2}$  in. long, all the six segments varying from bright scarlet to bright yellow, when red having only a small, black-yellow blotch at the base without any distinct border, oblong, acute, the three outer ones spreading away from the three inner; filaments in the red-flowered form glabrous, shorter than the dark purple anthers; peduncle 6 in. to 9 in. long, obscurely pubescent. April. *l.* three or four, lanceolate, the lower 1 ft. long, with a minutely ciliated margin. *h.* 2 ft. Central Asia, 1877. A fine species. (B. M. 6710; G. C. n. s., xlii., p. 652; R. G. 951.)

**T. macrospella** (broad-stained).\* *fl.*, perianth bright crimson, campanulate, 2  $\frac{1}{2}$  in. to 3 in. long, all the six segments decidedly obtuse,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. broad, having a large, distinct, nearly black, cuneate blotch, with a broad, yellowish-white border, filling up the whole claw; stamens black, one-third the length of the perianth; stigmas  $\frac{1}{2}$  in. in diameter, much crisped; peduncle glabrous. May. Habit of *T. Gesneriana*. Origin unknown; probably a hybrid between *T. Gesneriana* and some other species.

**T. maculata** (spotted). A well-marked, garden race, with the habit of *T. Gesneriana*, from which it differs by its bright red perianth segments, with a broad, black basal blotch, small stigma, and pubescent peduncle. End of May

**T. maleolens** (strong-smelling). This "agrees with *T. Oculus-solis* in bulb, leaves, stature, and peduncle; but the black blotch at the base of the perianth segments covers the whole claw" (Baker). The flowers have a faint, unpleasant scent. Italy, 1827. (B. R. 1839, 66.) *variegata* is a variegated form. (S. B. F. G. ser. ii. 153.)

**T. montana** (mountain-loving). *fl.*, perianth bright red, erect,  $\frac{1}{2}$  in. to 2 in. long, with oblong, acute outer, and often obovate, obtuse inner, segments, with a very distinct, black basal blotch; peduncle glabrous. July. *l.* three or rarely four, often curved and much crisped at the edges; lowest at most 6 in. long, and about 1 in. broad. Stems about 6 in. long. Bulb large, ovoid. Persia, &c., 1826. (B. R. 1106.) There are several varieties of this species, exhibiting marked differences in the colour of the flowers.

**T. neglecta** (neglected). A form of *T. stragulata*.

**T. Oculus-solis** (sun's-eye).\* *fl.* scentless; perianth 2  $\frac{1}{2}$  in. to 3 in. long; segments bright red, having a great, oblongeolate, black blotch, 1 in. or more long, with a yellow border, in the centre of the base. April. *l.* three or four; lowest 1 ft. long when fully developed,  $\frac{1}{2}$  in. broad. Stem 1 ft. to 1  $\frac{1}{2}$  ft. high. South of France, 1816.

**T. Orphanidea** (Orphanides'). *fl.*, perianth bright yellow, 2 in. to 3 in. long, the acute segments tinged with red on the outside; anthers oblong,  $\frac{1}{2}$  in. long; peduncle long, one-headed. May. *l.* three, linear, channelled. Stem 1 ft. to 2 ft. long. Mountains of Greece, 1862. (B. M. 6310; R. G. 373.)

**T. Ostrowskiana** (Ostrowski's). *fl.*, perianth bright red, 2 in. or more in diameter, each of the segments having a black spot at the base; filaments very short, dilated, and, as well as the anthers, purple. Spring. *l.* linear-lanceolate, glaucous. Turkestan, 1884. Closely allied to *T. Oculus-solis*. (B. M. 6895; R. G. 1144, figs. 1, 2.)

**T. patens** (spreading). *fl.*, perianth whitish, oblong-infundibular,  $\frac{3}{4}$  in. to 1 in. long, with a yellow eye inside, tinged green outside; stamens half as long as the perianth. April. *l.* two or three,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. broad. Stems 3 in. to 9 in. long, usually one, rarely two, flowered. Bulb-tunics obscurely pilose inside upwards. Central Siberia, 1817. **SYNS.** *T. sylvestris tricolor* (R. G. 827), *T. tricolor* (B. M. 3887).

**T. præcox** (early).\* This "cannot be regarded as distinct specifically in a broad sense from *T. Oculus-solis*, from which it differs in its more robust habit of growth, earlier flowering, and ovate, more imbricated perianth segments, with a less clearly marked basal blotch" (Baker). Italy, 1825. (S. B. F. G.



**Tulipa**—continued.

157; B. R. 330, under name of *T. Gesneriana*; B. R. 204, 1143, 1419, under name of *T. Oculus-solis*.)

**T. primulina** (Primrose-like). *fl.* strongly scented; perianth pale primrose-yellow, funnel-shaped, lin. long; outer segments lanceolate, tinged with bright red all over the back; inner oblong; peduncle glabrous, 2in. to 3in. long. Spring. *l.* four to six, crowded near the surface of the ground, linear, green, glabrous, channelled down the face, the outer ones 3in. to 4in. long. Stem less than 6in. above the surface, one-flowered. Bulb ovoid, lin. thick, with bright red-brown outer tunics. Eastern Algeria, 1882. (B. M. 6786.)

**T. pubescens** (downy).\* *fl.* faintly scented; perianth widely varying in colour. This is probably a hybrid between *T. Gesneriana* and *T. suaveolens*. It has the large stigma and six obtuse segments of the former, and the downy peduncle of the latter; the bright red forms have no blotch at the base of the perianth segments. (S. B. F. G. 78; B. M. 2388, under name of *T. suaveolens latifolia*.) To this belong several of the April-flowering garden races, such as BRIDE OF HAARLEM, DUKE OF YORK, and POTTEBARKER.

**T. pulchella** (pretty). *fl.*, perianth funnel-shaped, 1½in. long; segments mauve-red in the upper two-thirds, nearly uniform, oblong, acute, the claw slate-violet, with a yellow base; filaments whitish, densely pilose at base; peduncle slender, glabrous, lin. to 2in. long. April. *l.* three, crowded near the surface of the ground, green, channelled down the face, obscurely ciliated; outer one about 3in. long and ½in. broad, the inner ones narrower. Bulb ovoid, lin. in diameter; outer tunics rigid, dark chestnut-brown. Cilician Taurus, 1877. (B. M. 6304.)

**T. retroflexa** (retroflexed).\* *fl.*, perianth bright yellow, about 3in. long, with six uniform, oblong segments, narrowed gradually to an acute point; stamens yellow. Early in May. A garden plant, probably a hybrid between *T. acuminata* and *T. Gesneriana*.

**T. saxatilis** (rock-loving). *fl.* faintly Primrose-scented; perianth oblong-infundibular, 2in. to 2½in. long; segments bright mauve-purple in the upper two-thirds, and bright yellow on the claw, without any spot, the inner ones obovate-cuspidate, 1½in. broad, the outer oblong, less than lin. broad; stamens nearly lin. long; filaments bright yellow, twice the length of the blackish anthers; peduncle glabrous. March. *l.* three or four, lanceolate or linear, glabrous, the lowest above 1ft. long, lin. to 1½in. broad. Stems 1ft. or more long, often two-headed. Bulb medium-sized, ovoid. Crete, 1827. (B. M. 6374.)

**T. Schrenki** (Schrenk's). A synonym of *T. Gesneriana*.

**T. spatulata** (spathulate). A synonym of *T. Gesneriana spatulata*.

**T. stellata** (star-like). A near ally of *T. Chusiana*, with similar leaves and habit, but the perianth segments are more obtuse, and without the distinct purplish-black eye. February. Himalayas, 1827. (B. M. 2672.) There is a bright yellow variety, with the flower sometimes self-coloured, sometimes flushed with red on the outside.

**T. stragulata** (constricted). *fl.*, perianth segments furnished at the base with a large, black blotch, both in the typical red-flowered form, and also in some of the yellow varieties. April. This is very like *T. suaveolens*, but much taller. *T. Bonarottiana*, *T. neglecta*, and *T. vario-picta* are doubtless mere colour varieties. Four of the forms are figured in B. R. 1990, under name of *T. scabriscapa*.



FIG. 125. TULIPA SUAVEOLENS, showing Habit and detached Flower.

**T. suaveolens** (sweet-smelling).\* Van Thol Tulip. *fl.* fragrant; perianth red and yellow, large, with six equal, oblong, acute segments; stigma large; peduncle very downy. March and April. *l.* broad. *h.* 6in. South Europe, 1603. See Fig. 125. (B. M. 839; F. d. S. 1223.) Mr. Baker regards this as the original stock of many of our early-flowering garden forms.

**T. s. latifolia** (broad-leaved). A synonym of *T. pubescens*.

**T. sylvestris** (sylvan).\* Wild Tulip. *fl.* fragrant; perianth bright yellow, 2in. long, the segments elliptic-lanceolate; filaments woolly at base. April and May. *l.* few, 6in. to 10in. long,

**Tulipa**—continued.

linear, ½in. to lin. broad, glaucous. Stem 1ft. to 2ft. long, terete, flexuous. Bulb small, ovoid, stoloniferous; scales chestnut-brown. Europe (Britain). See Fig. 126. (B. M. 1202; Sy. En. B. 1520.) Syn. *T. fragrans*. Forms with two-flowered peduncles are not uncommon in cultivation.



FIG. 126. TULIPA SYLVESTRIS, showing Habit and detached Flower.

**T. s. tricolor** (three-coloured). A synonym of *T. patens*.

**T. thianschanica** (Thians-chan). *fl.*, perianth segments obovate-oblong, obtusely or minutely apiculate, less than lin. in length; peduncle glabrous, much shorter than the leaves. *l.* three, linear-lanceolate, falcate, minutely denticulate on the edge. Bulb having its outer tunics strigose towards the tip. Thian-schan Mountains.

**T. tricolor** (three-coloured). A synonym of *T. patens*.

**T. triphylla** (three-leaved). *fl.*, perianth bright lemon-yellow inside, tinged with green outside, rather funnel-shaped, erect, lin. to 1½in. long, the outer segments oblong and sub-acute, the three inner more obtuse; stamens less than ½in. long; peduncle glabrous, very slender. March. *l.* three or four, crowded near the base of the peduncle, falcate, linear, 3in. to 4in. long, ½in. to ½in. broad. Bulb small, with a few hairs inside the outer tunics. *h.* 6in. to 8in. Central Asia. (B. M. 6459; R. G. 942.)

**T. t. Hoeltzeri** (Hoeltzer's). *fl.* small; perianth yellow, the three outer segments purplish. *l.* linear-oblong, glaucous, undulate, lying on the ground. Turkestan, 1884. (R. G. 1144, figs. 3, 4 a-b.)

**T. turcica** (Turkish). A synonym of *T. Gesneriana Dracontia*.

**T. turkestanica** (Turkestan). *fl.* one to six. *l.* two, falcate, lanceolate. Bulb small, ovoid, the outer tunics densely hairy inside. Chiva. A near ally of *T. biflora*, from which it mainly differs in the long cusps of the valves of its capsule. (R. G. 1050, fig. 2.)

**T. undulatifolia** (undulate-leaved). *fl.*, perianth bright crimson-red inside, greenish-red outside, campanulate, 1½in. to 2in. long, the uniform segments gradually narrowed to an acute point, a black blotch with a yellow border covering the whole claw; stamens ½in. long, with black filaments and very small anthers; peduncle glabrous or pubescent. May. *l.* three, glaucous, lowest lanceolate, 6in. long, lin. broad, with a concave face and undulate margins. Stems 6in. to 5in. long. Smyrna, 1877. (B. M. 6308.) There is a form with less acute perianth segments.

**T. uniflora** (one-flowered). *fl.*, perianth segments pale yellow inside, oblancheolate, obtuse, ½in. to lin. long, the three outer strongly tinged with green on the outside and spreading in the expanded flower; peduncle erect. April. Stem slender, one-flowered, with a couple of spreading, lanceolate leaves from its middle. Bulb small, ovoid, with brown, membranous tunics produced far above its neck. Altai Mountains. Syn. *Orthytia uniflora* (R. G. 906, figs. 2-5; S. B. F. G. ser. ii. 336).

**T. vario-picta** (variously-painted). A form of *T. stragulata*.

**VARIETIES.** Subjoined are selections from the most showy and generally useful varieties that are adapted for pot-culture and, with very few exceptions, for planting in outside beds.

**Single Early-flowering and Bedding Tulips.** ARTUS, brilliant dark scarlet, very handsome and effective, large. BACCHUS, rich dark crimson; splendid bedding variety. BELLE ALLIANCE, crimson-scarlet; dwarf, early, and lasts long. CANARY BIRD, clear rich yellow; early. CHRYSOLORA, deep yellow, large, handsome; one of the best. COTTAGE MAID, rose-pink and white, flaked, very pretty. COULEUR CARDINAL, crimson-scarlet, very showy and effective, extra fine. CRIMSON KING, bright crimson, very showy. DUC VAN THOL (scarlet), very early, and one of the best for early forcing. JOOST VAN VONDEL, crimson, flaked with white, magnificent. KEIZERS-KROON, intense scarlet, bordered with yellow, immense; a splendid variety, which lasts long in perfection. LAC VAN RHYN,

**Tulipa**—continued.

dark violet, silvery-white margin. **LE MATELAS**, deep rose, flushed white, very beautiful; excellent for forcing. **L'IMMACULÉE**, white; very early, good for forcing. **PAUL POTTER**, beautiful rose-magenta, distinct and fine. **POTTEBAKKER WHITE**, pure white, large, handsome; early. **PRINCESS MARIANNE**, creamy-white, large, handsome. **PROSPERINE**, rosy-carmine, very large, handsome; one of the best. **QUEEN VICTORIA**, rosy-white; good bedder. **ROSE APPLATI**, rose, very large, handsome. **ROSE GRIS-DE-LIN**, rose, shaded with white, very fine. **ROSE LUISANTE**, fine, deep rose; splendid forcé variety. **ROYAL STANDARD**, white, feathered with rosy-crimson, showy. **THOMAS MOORE**, orange-scarlet, very pretty, and quite distinct. **VAN DER NEER**, rich violet, very handsome, extra. **VERMILION BRILLIANT**, dazzling scarlet; good forcing variety, very early. **WOUVERMAN**, violet-purple, large. **YELLOW PRINCE**, golden-yellow; fine for forcing, very sweet-scented.

**Double Early-flowering and Bedding Tulips.** **COURONNE DES ROSES**, shaded rose, very fine and handsome. **CRAMOISIE SUPERBE**, crimson; fine bedder. **DUKE OF YORK**, deep rose, edged with white, showy and effective; late-flowering. **GLORIA SOLIS**, orange-crimson, deeply edged with golden-yellow. **IMPERATOR RUBRORUM**, crimson-scarlet, extra fine. **LA CANDEUR**, white, very double, fine; rather late-flowering. **LEONARDO DA VINCI**, crimson-edged, golden-yellow, very fine. **MURILLO**, rosy-white; excellent for forcing. **PEONY GOLD**, golden-yellow, feathered crimson, fine; rather late. **PRINCESS ALEXANDRA**, crimson, edged with golden-yellow, fine. **PURPLE CROWN**, rich purplish-crimson, very large and effective; rather late. **REX RUBRORUM**, brilliant crimson-scarlet; highly effective in beds; rather late. **ROSINE**, rosy-pink; fine for bedding. **SALVATOR ROSA**, dark rose; one of the best double rose varieties. **TOURNESOL**, scarlet, edged with yellow, large and handsome; the best double variety for forcing. **TOURNESOL YELLOW**, yellow, suffused reddish-orange, large. **YELLOW ROSE**, bright golden-yellow; late-flowering.

**Parrot Tulips.** These are very effective in borders and shrubberies, but are not adapted for pot-culture. They produce large, brilliantly-coloured flowers. Amongst the best are: **ADMIRAL DE CONSTANTINOPLE**, red, tipped with yellow; **FEU BRILLANT**, crimson; **LUTEO MAJOR**, yellow, slightly striped crimson and green; **MARK GRAAF**, yellow, striped scarlet and green; **MONSIEUR ROUGE**, crimson, large; **PERFECTA**, yellow, scarlet, and green.

**TULIP, AFRICAN.** A common name for **Hæmanthus** (which see).

**TULIP-BEARING MYRTLE.** See **Darwinia macrostegia**.

**TULIP, BUTTERFLY.** A popular name for **Calochortus lilacinus** (which see).

**TULIP, DROOPING.** A common name for **Fritillaria Meleagris** (which see).

**TULIP, GOLDEN STAR.** A common name for **Calochortus pulchellus** (which see).

**TULIP-TREE.** See **Liriodendron tulipifera**.

**TULIP-TREE, LAUREL-LEAVED.** A popular name for **Magnolia** (which see).

**TULIP, WILD, OF CALIFORNIA.** A common name for the genus **Calochortus** (which see).

**TUMBOA.** A synonym of **Welwitschia** (which see).

**TUMID.** Swollen.

**TUNGA.** A synonym of **Hypolytrum** (which see).

**TUNHOOF.** A common name for **Nepeta Glechoma** (which see).

**TUNIC.** A coat; a seed cover.

**TUNICA** (from *tunica*, a coat; in reference to the overlapping of the floral envelopes). **ORD.** *Caryophyllæ*. A genus embracing about half-a-score species of hardy, annual or perennial herbs, natives of mostly Southern Europe and Western Asia. Flowers smaller than those of *Dianthus*, cymose-paniculate, glomerate, or capitate; calyx obtusely five-toothed; petals five, with elongated claws, and retuse or emarginately bifid blades; stamens ten. Leaves narrow. The under-mentioned species thrives in any light soil, and on old walls, ruins, &c. It is also adapted for planting on rockwork, and at the front of mixed borders. Propagated readily from seeds.

**Tunica**—continued.

**T. Saxifraga** (Saxifrage-like). *fl.*, calyx campanulate, the teeth triangular-ovate; lamina of corolla pink, short, retuse or erose. July. *l.* scabrid, narrow-linear, acute. Stems numerous, ascending or diffuse, paniculate. Central and South Europe. Perennial.

**TUNICATED.** Having a coat or coats.

**TUPA.** Included under **Lobelia** (which see).

**TUPELO-TREE.** See **Nyssa**.

**TUPIDANTHUS** (from *tupis*, *tupidos*, a mallet, and *anthos*, a flower; referring to the shape of the flower buds). **ORD.** *Araliaceæ*. A monotypic genus. The species is at first a small, glabrous, erect tree, afterwards a lofty climber. It thrives in sandy loam. Propagation may be effected by cuttings, inserted in sand, under a bell glass, in heat.

**T. calyptratus** (calyptrate). *fl.* green; buds  $\frac{1}{2}$  in. in diameter, nearly globose; stamens fifty to seventy; main umbel about three-rayed, the branches  $\frac{1}{2}$  in. long, very stout, with large bracts at their bases; partial umbels five to seven-cleft. *l.* digitate; leaflets seven to nine, entire,  $\frac{7}{16}$  in. by  $\frac{1}{2}$  in., narrow-oblong, shortly acuminate, narrowed at base; petiolules  $\frac{1}{2}$  in. long. India, 1855. (B. M. 4908.)

**TUPISTRA** (from *tupis*, a mallet; alluding to the peculiar form of the stigma). Mallet Flower. **SYN.** *Platymetra*. Including *Macrostigma* (of Kunth). **ORD.** *Liliaceæ*. A genus embracing three or four species of stove, perennial herbs, inhabiting the Himalayas or Burmah. Flowers sessile, clustered; perianth violet or lurid, campanulate, with a broad, scarcely contracted tube, and six, rarely eight, short, spreading, sub-equal lobes; stamens six or eight; spike terminal, dense, cylindrical; scape short or elongated, erect or recurved at apex, simple. Leaves radical, long, ample, contracted into the petioles. Rhizome thick. The two species known in cultivation thrive in rich loam; they may be increased by suckers, or by division of the plants, in spring.

**T. macrostigma** (Macrostigma). *fl.*, perianth dark purple,  $\frac{1}{2}$  in. across, campanulate; spike drooping, lax,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long; peduncle dark purple, erect, as long as the spike. December. *l.* lanceolate, acute, chartaceous, above  $\frac{1}{2}$  in. long, bright green; petioles dilated at base, firm, erect,  $\frac{1}{2}$  in. or more long. Rhizome creeping, much-branched. Khasia, 1876. (B. M. 6280.) **SYN.** *Macrostigma tupistroides* (R. G. 192).

**T. nutans** (nodding). A synonym of *T. squalida*.

**T. squalida** (squalid). *fl.*, perianth lurid-violet, or with the tube greenish, six to eight lines long; bracts large, scarious, deltoid; spike dense, nodding,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long; scape  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long. March. *l.* oblanceolate, erect,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. broad, long-petioled, narrowed at both ends. Rhizome fleshy. Himalayas, 1820. (B. M. 1655; B. R. 701; L. B. C. 515.) **SYN.** *T. nutans* (B. M. 3054; B. R. 1223).

**TURBINATE.** See **Top-shaped**.

**TURF.** A term applied to grass sods which are laid over the surface of ground to form lawns, edgings, verges, &c. Laying or cutting out flower-beds in Turf is a familiar operation. Turf is also cut from fields, and stacked in heaps for decomposing and forming loam, which is in daily request for potting and various other purposes. When used for forming new lawns, &c., that are to be kept mowed, it is most important that the Turf should be as free as possible from weeds, such as Daisies, Plantains, and the like. Pasture land which has long been laid down, and the grass closely eaten off by sheep or deer, is generally the best, as, provided the soil is fairly good, the more grazing or cutting is practised, the more dense does the Turf become at the root, and this is, of course, most favourable to the quick formation of a new lawn. The ground should be first prepared, made thoroughly firm by treading, and raked fine, before the Turf is laid. Autumn, and any favourable weather during winter and early spring, are best suited for the work. A handy size for cutting Turfs, when they are sufficiently tough for rolling, is 3 ft. long by 1 ft. wide; they are best cut with a turfing-iron, or, what is worked in a similar way, a turf-plough. Small squares (about

**Turf**—*continued*.

9in.) are readily fitted together, and are often preferable to 3ft. lengths. All the interstices should be filled in with fine soil, swept with a birch broom, and then the whole surface may be rammed or beaten with a turf-beater. It is important to get newly-laid Turf consolidated, and the pieces all fitted together, while the ground is moist. If from any cause Turf should have to be laid late in spring, or during summer, it often becomes dried up, and the pieces separate from each other; the work should not, therefore, be left until those seasons, if it can be avoided. It is of little use watering from the top in summer, but new Turf may be more readily re-established at that season by watering the ground first, and then laying the sods on the top.

**TURF-BEATER, or TURF-BEETLE.** This is used for beating the surface of newly-laid turf, to consolidate and render it level. A Turf-beater may easily

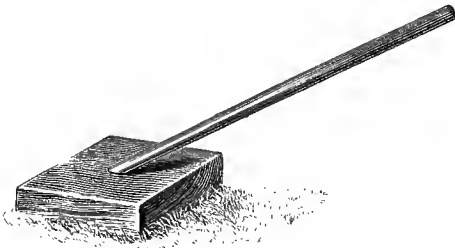


FIG. 127. TURF-BEATER.

be made from a flat, oblong piece of wood 3in. thick. A strong handle should be fixed into the centre of the upper side at an angle sufficiently acute to allow the Beater to be brought down flat on the turf when in use (see Fig. 127).



FIG. 128. TURF-SPADE.

**TURF-RASER.** A useful implement where a large quantity of turf has to be cut; it is employed for marking out the proper width for cutting in strips, and is used by a person who works in advance of others lifting the turf. A very simple form, but still one which answers most effectually, consists of an ordinary wooden handle with the point of an old scythe fixed into one end of it, at nearly or quite a right angle. This blade cuts into the turf at a uniform depth, and is guided along a line by the workman using it.

**TURF-SCRAPER.** A Scraper, made of wood or iron, similar to those used for roads, answers equally well for scraping lawns when worm-casts or ant-hillocks abound. A Turf-scraper is not, as a rule, otherwise required.

**TURF-SPADE, or TURFING-IRON.** An implement used for lifting turf that has previously been cut through with an edging-iron or a turf-raser. It has a bent handle, and a heart-shaped, flat blade (see Fig. 128), and is much handier for the purpose than an ordinary spade, as, if properly used, any quantity of turf may be cut of about a uniform thickness.

**TURF-WALKS.** Walks formed of turf instead of gravel, stones, or other hard substances. They require in formation exactly the same preparation as lawns, with, of course, the width limited. Occasionally, but not very frequently, Turf-walks are introduced into kitchen gardens.

**TURGID.** Swollen; puffed up.

**TURGOSEA.** Included under *Crassula*.

**TURIO.** A scaly sucker, which afterwards becomes a stem, as in *Asparagus*.

**TURKEY CORN.** A popular name for *Dicentra formosa* (which see).

**TURKEY OAK.** See *Quercus Cerris*.

**TURK'S CAP.** See *Melocactus communis*.

**TURK'S HERB.** An old name for *Herniaria glabra* (which see).

**TURMERIC.** See *Curcuma*.

**TURMERIC ROOT.** A common name for *Hydrastis canadense* (which see).

**TURNERA** (dedicated by Linnæus to the memory of William Turner, author of a "New Herbal," 1551; he died in 1568). Including *Piriqueta*. ORD. *Turneraceæ*. A genus comprising about seventy species of stove herbs, sub-shrubs, or shrubs, all tropical American, with the exception of one found in South Africa. Flowers yellow, axillary, solitary, rarely racemose or fascicled; calyx five-parted; petals five, inserted in the throat of the calyx; stamens five, inserted below the petals; peduncles free or connate with the petioles. Leaves scattered, entire, serrated, or sub-pinnatifid, often biglandular at base. Most of the Turneras have a weedy aspect, but those here given are rather pretty subjects when in flower. They thrive in any light soil. Propagation may be effected by seeds, which are freely produced; the shrubby species may also be increased by cuttings, inserted under a hand glass, in heat; and the herbaceous perennials either by cuttings or by divisions.

**T. trioniflora** (Ketmia-flowered). A synonym of *T. ulmifolia elegans*.

**T. ulmifolia** (Elm-leaved).\* West Indian Holly or Sage Rose. *f.* almost sessile, about the size of those of *Reinwardtia trigynum*; peduncles bibracteate, connate with the petioles. June to September. *l.* oblong, acute, serrated, pubescent above, white-tomentose beneath, biglandular at base. *h.* 2ft. to 4ft. South America, 1733. Perennial herb. See Fig. 129. (B. M. 4137.)

**Turnera**—continued.

**T. u. angustifolia** (narrow-leaved). *l.* oblong-lanceolate. (B. M. 281, under name of *T. angustifolia*.)

**T. u. cuneiformis** (wedge-shaped). *fl.*, claws of the petals brownish. *l.* obovate-cuneate, coarsely serrated. *h.* 1ft. to 3ft. Brazil, 1821.

**T. u. elegans** (elegant). *fl.* sessile, as large as those of the Bladder Ketmia; petals pale yellow or sulphur-coloured, with purplish-brown claws. All the year. *l.* oblong-lanceolate, coarsely serrated, cuneate at base, quite entire, pubescent. *h.* 1ft. to 2ft. Brazil, 1812. *SYN.* *T. trioniflora* (B. M. 2106).

**TURNERACEÆ.** A natural order of glabrous or pubescent herbs or shrubs, mostly American, a few being African, and one broadly dispersed over Asia, but not indigenous. Flowers regular, hermaphrodite, axillary, solitary or few, sessile or pedunculate, rarely racemose; calyx tubular, five-cleft, deciduous, the lobes imbricated; petals five, inserted at the throat of the calyx, clawed, membranous, twisted, deciduous, naked or with a scale at the tip of the claw; stamens five, very rarely hypogynous; filaments free, flat-subulate; anthers oblong; ovary free, one-celled; styles three, filiform; peduncles free or connate with the petioles, occasionally jointed,

**Turnip**—continued.

attempting to force Turnips too early in spring: they should not be sown under glass until the weather is favourable for admitting plenty of air. The first supply may be obtained by sowing some seed broadcast in a frame, during February or early in March. The least bottom heat from fermenting material may be allowed, but a spent hotbed or cold frame, with from 3in. to 6in. of rather fine, light soil in it, will do; an early variety should be selected—Early Munich is one of the best. The seedlings require thinning out so soon as they are large enough to handle. Plenty of air must be allowed, to insure a sturdy growth, and when the leaves get strong the frame may be removed. The season will by this time be advanced and the weather warmer than at the period of seed-sowing. Attention to watering is the principal point in after-cultivation. A valuable supply may be thus obtained in advance of any that could be grown entirely in the open air; a two-light frame at least should be allowed, as it could scarcely be more profitably utilised.

By the middle of March, the first sowing may be made on a south border, and successional sowings according to



FIG. 129. FLOWERING BRANCH OF *TURNERA ULMIFOLIA*.

often bibracteolate. Capsule one-celled. Leaves alternate, petiolate, simple or pinnatifid, often argutely serrated, frequently biglandular at base; stipules small or wanting. The order embraces three genera—*Erblichia*, *Turnera*, and *Wormskioldia*—and about seventy-six species.

**TURNIP** (*Brassica Rapa*). A hardy biennial, native of Europe (Britain), &c.; cultivated from a remote period, for the use of the fleshy roots, which are boiled and served as a vegetable in various ways. The tender growing tops are also gathered in spring, and cooked as a green vegetable; and they are sometimes blanched at the same season as a substitute for Seakale.

*Cultivation.* The Turnip is chiefly an autumn and winter crop, as it succeeds best in cool, moist weather; but early and successional supplies may be procured by commencing to sow early in spring, and keeping on at intervals until July. In summer, Turnips not unfrequently run to seed without forming roots of a useful size; and during dry weather they are, if procurable, often stringy, and of inferior quality. The destructive Turnip Flea has also to be contended against; all through early summer especially, its attacks are commenced on the seedlings so soon as they appear above ground. It is of little use

requirements will be necessary until the end of June or early in July, when the seed for the main crop should be put in. In favoured districts, any time in July will do, and sowings may even be made up till the end of August with successful results. Turnip seed usually grows very freely, and the young plants appear above ground in a very short time. Some cultivators sow broadcast, but the ground is more readily kept free from weeds and the plants thinned out when the plan of having drills is adopted: the latter is therefore recommended. Drills 1ft. apart will suffice; they should be drawn with a hoe not more than 2in. deep, and the plants may be thinned to about 9in. apart, though this distance may vary somewhat according to the strength of the variety and the season. During summer a cool situation is preferable, and in dry weather it is often necessary to keep Turnips watered. If this is not done, growth becomes checked, and either the plants run to seed or the roots lose their succulent nature and become pithy. The main crop may be left in the ground, to be pulled when required, but for the purpose of having a supply in very severe weather it is advisable to lift a portion, cut off their tops—not too closely—and store them in sand or soil ready for use. The crops at all seasons are much benefited by keeping the soil between

**Turnip**—*continued.*

hoed and loose on the surface. Damp, dull weather is most favourable for Turnip cultivation; but as the crop is of much importance throughout the season, all that can be done during the summer to counteract the evil influences of drought should receive full attention. If two or three varieties are sown at the same time, sometimes one will thrive if another fails. Turnips succeed best in rich, rather light, loamy soils; ground which is stiff and retentive is not well adapted, as the roots do not attain a good flavour, and in the summer are more apt to run to seed; light, gravelly soils are also unsuitable.

**Animal Pests.** The animal foes of this valuable plant are both numerous and varied. A large proportion of them attack the roots. Ants are said to carry off the seed, and to endanger the crop at times; and sparrows and other seed-eating birds assist in such depredations. The germinating plants, so soon as they appear above the soil, are too often wholly destroyed by the **Turnip Flea or Fly** (which *see*), and by small Weevils, such as **Otiorynchus** (which *see*), and **Ceuthorrhynchus contractus**, which is nearly related to the Turnip-gall Weevil (*see* **Turnip Galls**) and **Turnip-seed Weevil** (which *see*). The best treatment for the destruction of these insects is mentioned under the above headings.

When the plants are somewhat larger, the leaves are often so eaten by numerous larvæ, that merely the larger veins remain, or, at least, large holes are gnawed in the leaves and other green parts, to the injury of the plants, and the consequent diminution of the root-crop. The larvæ (*see* **Cabbage Caterpillars**) of the White Butterflies (*Pieris Brassicæ*, *P. Napi*, and *P. Rapæ*) feed on the leaves of Turnips, as they do also on Cabbages; and they are assisted in this by the larvæ of various Night-moths, e.g., of **Mamestra** (which *see*), and of **Plusia gamma** (which *see*) and others noted under the headings **Potherb Moths** and **Surface Caterpillars**. The larvæ of a small Moth, **Plutella cruciferarum** (which *see*), are very numerous in some localities, living under webs on the lower surfaces of, and eating holes in, the leaves.

Still more dangerous than the Butterflies and Moths is *Athalia spinarum*, the **Turnip Sawfly** (which *see*), the larvæ of which at times devastate entire fields. An allied species (*A. ancilla*) also proves destructive occasionally, though to a less extent.

Various Beetles assist in destroying the leaves of Turnips, chief among them being the **Turnip Flea** (which *see*); though Curtis accuses **Phædon Betulæ** (which *see*) and *Otiorynchus* of aiding in the harm done.

Besides the holes eaten through them, the leaves are often marked with white, wavy tracks, or mines, burrowed between the surface-membranes. These mines are the work of larvæ of small Flies (*Drosophila* and *Phytomyza*), and of the **Turnip Flea** (which *see*). The flowers inclosing the young ovaries are favourite resorts of numerous Beetles, some of which gnaw the various organs, devouring the ovaries, or rendering them unfertile. The flowers and flower-stalks, and, to a less extent, the leaves, are sometimes injured by more than one kind of plant-louse (*see* **Aphides**). The seeds are devoured in the seed-vessels, while soft, by larvæ of certain small Midges belonging to the group of Gall-midges (*Cecidomyiæ*), but these scarcely alter the form of the fruit. The larvæ of the **Turnip-seed Weevil** (which *see*) also devour the seeds in the fruit. From their concealed mode of life, little, if anything, can be done against those insects that feed on the seeds. But, while the green parts, the flowers, and the seeds, are all liable to serious injury from animals, and the roots thus suffer indirectly, the latter parts suffer from direct attacks even more seriously than do the other organs. All herbivorous quadrupeds eat them; and hares and rabbits are

**Turnip**—*continued.*

peculiarly hurtful where Turnips are grown in an insufficiently inclosed area. Rooks also greatly injure Turnips, by scooping out holes in them to obtain food during snowy weather. In localities near the sea-coast, a similar habit is frequently indulged in by sea-gulls. Among the most effectual protections against birds are threads stretched in zigzags near the soil, and decked with rags, or other fluttering objects, suitable to act as scarecrows.

Some account of the more destructive parasites of Turnip roots is given, along with the most successful remedies against each, under the headings **Slugs**, **Snails**, **Surface Caterpillars**, **Turnip Galls**, **Turnip Moths**, and **Wireworms**; and it would occupy unnecessary space to repeat what is contained in those articles. When the roots have begun to decay, the change is hastened by numbers of **Millipedes** (which *see*) and insects (chiefly larvæ of small Beetles and Midges) that feed in them, and soon reduce them to the condition of putrescent masses.

In Germany, it has been observed that Turnips and other Crucifers are liable to have the smaller side-roots more or less injured by the production of small, round galls on them, the work of a minute worm (*Heterodera Schachtii*), of which an account is given, and appropriate remedies are discussed, under **Nematoid Worms**.

**Fungi.** Turnips are liable to serious injury from the attacks of several species of Fungi, most of which have been already discussed in this work under headings quoted below. Almost all of them also infest Cabbages and cruciferous weeds—a circumstance that must be kept in mind in the means employed for preventing or curing diseases caused by them in Turnips. Of those that have proved peculiarly injurious in Great Britain, the more hurtful are the following:

**Plasmodiophora Brassicæ** (which *see*), producing “Clubroot,” or “Finger-and-Toe,” in the roots, of which they cause the early death and decay, so that the crop is largely, if not entirely, destroyed in severe attacks.

The leaves are frequently “mildewed.” One form of “Mildew” is caused by the growth of the superficial mycelium of *Oidium Balsamii* (*see* **Oidium**), which is itself a young stage of an *Erysiphe* of some kind, of which the perfect condition is uncertain. The thread-like cells of the Fungus spread in a thin, whitish coat over the whole of both surfaces of the leaf, from which they draw their nourishment, without, however, traversing its tissues; and they injure it both by the nourishment they absorb from it, and by hindering free interchange of gases and fluid between the cells of its interior and the air. The leaves wither and dry up, and the plants are insufficiently nourished, with evil effects to the roots. For a remedy, *see* **Oidium**.

*Peronospora parasitica* gives rise to another form of “Mildew” on the leaves. This shows itself in whitish patches, which consist of erect stalks, much branched above, and bearing on the tips of the branches the nearly globose conidia or reproductive cells. The mycelium of the Fungus burrows among the inner cells of the leaf, and only the stalks just spoken of are seen on the surface, passing out through the stomata. The sexual reproduction of the Fungus is also provided for by the mycelium in the leaves, as described under **Peronospora**. The upper surface of the leaves is mildewed by this Fungus far less frequently than the lower; but the presence of the parasite is shown by yellowish-green or yellow patches on the surface. *P. parasitica* frequently grows in the flower-stalks and in the flowers, which, under its influence, become much distorted and swollen, and fail to produce seeds. All parts in which it grows are liable to premature death and rapid putrefactive decay in moist air. For treatment, *see* **Peronospora**.

**White Rust** is very often associated with *P. parasitica*, growing on the same spots of the plant, and

**Turnip—continued.**

actually intermingled with it; but frequently, also, they grow apart from one another. The White Rust resembles splashes of whitewash, when the conidia are matured on the diseased spots, which latter are usually swollen and distorted. It occurs on stems, leaves, and flowers. The Fungus (*Cystopus candidus*) is nearly related, in a good many points, to *Peronospora*. For an account of its structure, and of the treatment to be employed against it, see **Rust**.

The leaves frequently show spots or patches, often lin. or more in breadth, at first yellowish, but soon becoming withered and dry. On these spots, the microscope shows minute Fungi. On some, there may be found slender conidia (with many septa, or cross-walls), on the tips of short threads, pushed through the stomata. This form of Fungus has been named *Cercospora Blouami* by Messrs. Berkeley and Broome. On other spots occur small dark **Pycnidia** (which see), in which are produced small, oval, pale sporidia, one-celled (*Phyllosticta Brassicæ*), or two-celled (*Ascochyta Brassicæ*). The relations between the Fungi found on such patches are still very uncertain. Turnips do not suffer very seriously from the presence of these Fungi, as the latter seldom affect the young, vigorous leaves, but prefer the lower leaves when already half-dead. It is, therefore, unnecessary to dwell upon treatment, further than to mention that it is a wise precaution to destroy—if possible, by fire—all leaves overgrown with parasites.

Two other Fungi have been described as occasionally very injurious to Turnips in Germany, and a brief notice of them will not be out of place here. *Polysphum exitiosus* is the name given by Dr. J. Kühn to a Fungus described by him as extremely injurious to Turnips, destroying both the leaves and the unripe seed-vessels. Very dark spots appear on the diseased organs; the spots spread, and the tissues become discoloured, and dry up. If the seed-vessels are attacked while young, the seeds do not ripen; but if the disease is late in its appearance, they may ripen, but are soon destroyed, the valves of the fruit shrivelling, and bursting away prematurely. In the diseased tissues, the mycelium of a Fungus is present in abundance, absorbing the nourishment in the cells, and destroying the cell contents and cell walls. From this mycelium rise erect branches, which project through the epidermis of the leaf, and bear, on their tips, conidia that vary much in form, but that, when mature, are clavate, being fixed by the broader end, and having the other prolonged as a slender filament; or there may be a series of from five to ten such conidia, end to end, forming a chain. The conidia are dull or brown-violet, and are divided into cells, by numerous cross-walls, and a few longitudinal ones. The conidia readily fall off the erect branches, and germinate speedily, in damp, warm weather, spreading the disease if they fall on green parts of Turnip-plants, under suitable conditions. This Fungus produces brown, withered spots in the parts affected, often surrounded by a yellow or reddish border. On these spots develop **Pycnidia** (which see) of *Phyllosticta Brassicæ*, and perithecia of a **Pleospora** (which see), perhaps *P. herbarum*. The only treatment possible is to endeavour to prevent future attacks, by destroying diseased parts of plants without delay.

*Peziza sclerotiorum* is blamed by Dr. Frank as the cause of a peculiar disease of Turnips, which was prevalent, near Leipzig, in 1879. The plants became yellow during July. The cause of this was a diseased state of the stems, commonly near the base, which manifested itself in a pale colour, and in a separation between the epidermis and the tissues below it. On breaking the stem, the pith is found occupied by a black, oval body, the sclerotium, from which the above *Peziza* grows out in the following spring. For an account of the structure

**Turnip—continued.**

of the Fungus, and of the treatment advised against it, see **Peziza**.

**Sorts.** These are very numerous, but it is unnecessary to grow many varieties if attention is given to include those which are adapted for early use, and others for main crops. The shapes and outside colours vary in the different sorts; but this is of little importance, provided the inner flesh is of good quality. The flesh is either white or yellow: white-fleshed varieties are generally preferred in the southern division of the country, while yellow ones are more largely cultivated in the north.



FIG. 130. EARLY STRAP-LEAVED WHITE STONE TURNIP.

CHIRK CASTLE BLACK STONE, skin black; very fine and hardy. EARLY PARIS MARKET, white, oblong in shape; early, a much-esteemed French variety. EARLY PURPLE-TOP MUNICH, distinct and very early; one of the most valuable for frame culture and for early crops, the produce is at its best when about half or three-parts grown. EARLY RED AMERICAN STRAP-LEAVED STONE,

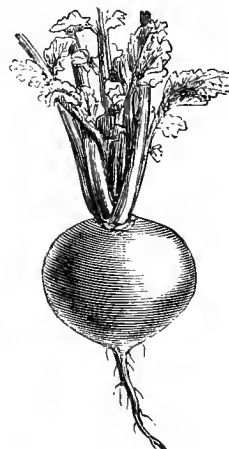


FIG. 131. ORANGE JELLY TURNIP.



**Turnip**—*continued*.

flesh white and firm; very early. **EARLY SNOWBALL**, one of the best whites, sweet and tender; early, largely grown for the London markets. **EARLY STRAP-LEAVED WHITE STONE**, fine quality; suitable for very early and for late sowing (see Fig. 130). **EARLY WHITE DUTCH**, an old and well-known sort, of excellent quality. **EXTRA EARLY MILAN**, bulb flattened, with purple top; very early, and compact in habit. **ORANGE JELLY**, or **GOLDEN BALL**, an excellent yellow variety (see Fig. 131); much favoured in the north of England and in Scotland. **VEITCH'S RED GLOBE**, of handsome shape and fine flavour;



FIG. 132. YELLOW MALTA TURNIP.

one of the best for main crop, and for use in winter. **YELLOW MALTA**, a handsome yellow variety, of good quality, but sometimes rather strong-flavoured (see Fig. 132).

**TURNIP, DEVIL'S.** A common name for *Bryonia dioica* (which see).

**TURNIP FLEA, or TURNIP FLY.** Names commonly given to two or three species of *Phyllotreta* (which see). This genus of small Beetles belongs to the large group formerly included under the generic name *Haltica*, but now, for convenience, subdivided, by minute characters, into numerous genera. All the insects in this group have the thighs of the hinder pair of legs thickened, whereby they are enabled to leap several inches. This power and their small size have gained for them the popular name of Fleas, though widely different from true Fleas in many respects. They all feed on plants, several being attached to the *Cruciferae*. Turnips are often ravaged by *P. nemorum*; and *P. concinna* is also a dangerous foe to these plants in some localities. *P. consobrina* and *P. obscurella* are mentioned by Curtis, in "Farm Insects," as not uncommon on Turnips; and *P. flexuosa* and *P. Lepidii* have been recorded as dangerous in Germany. However, the general appearance and the habits of all are much alike; as are also the remedies that should be employed against their attacks. The general form of the species in the genus is well shown in Fig. 133; but the size varies from

**Turnip Flea, or Turnip Fly**—*continued*.

$\frac{1}{16}$  in. to  $\frac{1}{8}$  in. in length. All have the ground-colour very dark olive-green or metallic-green. *P. nemorum* has a broad ochre-yellow streak down each wing-case (see

FIG. 133. TURNIP FLEA (*Phyllotreta nemorum*), magnified.

Fig. 133); and the legs are rusty-ochre, with pitchy thighs. *P. concinna* is more oval and convex than the former species, and is of a uniform greenish-black, with a shining coppery or brassy lustre—the legs being black, except the rusty-red base of the tibiae. *P. consobrina*, *P. Lepidii*, and *P. obscurella*, are much like *P. concinna*, the four species differing in the pitting of the surface, in the peculiar shade of the metallic lustre, in the colour of the base of the antennae, in the proportions of the fourth and fifth joints in these organs, and in size of body, to a slight degree. *P. flexuosa* is more like *P. nemorum*, being black, with a pale clay-yellow line down each wing-cover; but the pale line is narrow and wavy, and the knees are pitchy-black, not reddish; and the fourth and fifth joints of the antennae are shorter than in *P. nemorum*.

An account of the life-history of the very common species *P. nemorum* may be regarded as fairly representative of the habits of all that attack Turnips; so that the following remarks, though referring primarily to that species, will also, in great measure, be applicable to the others. The Beetles usually pass the winter concealed under rubbish on the soil, e.g., stubble or other dead herbage, clods, &c., though an occasional warm day brings them out of their shelters. In spring, they begin to feed on the cruciferous weeds (Shepherd's Purse, &c.), which are only too plentiful everywhere, alike in cultivated ground and in waste spots. When the cotyledons and first leaves of the seedling Turnips appear above the soil, they form the favourite food of the Beetles, which gnaw away the tissues till little more than the skeletons of the leaves remain, and the plants die in vast numbers. The crops are occasionally ruined; and even second and third sowings are sometimes destroyed in the same way. After the young plants have produced the rough leaves, the danger of serious injury from this cause is comparatively slight; though large holes are gnawed by the insects in the leaves. The female beetles each lay a few white eggs, here and there, on the lower surface of the leaves. In about ten days, the larvæ are hatched. They are pale yellowish maggots, with three pairs of legs in front, and a sucker at the end of the body. They gnaw through the skin of the leaf; and, for about a week burrow in the tissues below it. They then are full-fed, drop to the ground, and burrow from 1 in. to 2 in. into the soil, to become pupæ. In about a fortnight, the beetles emerge. There may thus be, and usually there are, several broods in a season.

**Prevention and Remedies.** It is most desirable to clear away all cover that can protect the insects. The ground should be cleared of all cruciferous weeds, such as supply the insects with food before the appearance of the Turnip crop. Digging and ploughing the soil in winter destroys many of the Beetles, by burying them too deeply to allow of their return to the surface.

It should be kept in mind that the dangerous period to the crop is while the seedlings are quite young, and that the danger is very much less when the plants have formed the rough leaves; consequently, whatever strengthens

**Turnip Flea, or Turnip Fly**—*continued.*

the plants, and shortens the duration of the dangerous period, is a valuable means of preventing harm. It is, therefore, of great importance to have the soil thoroughly prepared before the seed is sown, as well as to give a good supply of manures, such as phosphates and nitrogenous manures, and also to water the plants in dry weather. It has been suggested that thick sowing (up to 10lb. of seed per acre) will give a better prospect of escape from complete loss by the Turnip Flea; but this is not advisable, as overcrowding is apt to render the plants weak, and to prolong the period of danger from the Beetles, as well as to do harm in other ways.

A method sometimes employed to protect Swedish Turnips, is to mix the seed with one-third of its weight of the seed of common Turnips, the young plants of which are preferred by the insects.

Should the crops be attacked, the injury may be lessened, even though a cure should not be effected, by one or other of the following methods: A light, shallow tray may be tarred inside, and dragged over the rows of Turnips, having something at such a distance in front as to disturb the insects, so as to cause them to leap into the tray when roused. Many can thus be caught, the tar holding them fast; or a large hand-net, such as entomologists use in "sweeping" for insects, may be made use of, the plants being swept with it. Rolling the ground in the early morning has been found beneficial, as has been also the treading of a flock of sheep, kept in constant motion in the field, for an hour or two, in the early morning. The latter operations should be carried out only while the dew is still on the herbage; and the same rule should be observed in the application of dressings of all kinds, as these are found to be far more efficacious if put on while the plants are wet. Soot may be sprinkled along the drills of Turnips; but the dressing that has given the best results is said to be made up as follows: One bushel of fresh gas-lime, one of fresh lime, ten pounds of soot, and six pounds of flowers of sulphur, mixed and powdered thoroughly, and applied broadcast or along the rows while the dew is still on. The above amount is enough for two acres. Another mixture also strongly recommended is two bushels of road-scrappings, one of fresh lime, and fourteen pounds of sulphur per acre, applied as above.

**TURNIP GALLS.** The work of a small Weevil, which also forms somewhat similar Galls on Cabbages. A brief description of the Beetle (*Ceuthorrhynchus sulcicollis*) will be found under **Cabbage Gall Weevil** (where, however, the name is spelt *Ceutorrhynchus*). To the particulars there given, a few words may be added. The colour of the insect is black, slightly shining, sprinkled with a few grey hairs, or small scales; the head and thorax are much punctured, and the latter has a deep median furrow, and a small prominence on each side; the wing-cases bear small prominences in front of the tips, and each thigh of the hindmost legs is toothed on the inner side. The length of body is  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. The females lay their eggs near the top of the roots of most Crucifers. In Turnips they do so a little above, or close to, the soil. In a short time, a Gall begins to appear, and at last its form and size may resemble a large half-pea fixed to the root by the flat side; or two or more may unite in growth. The Galls are fleshy, like the roots; and in each is a cavity, tenanted by a curved, whitish, footless maggot, which, when full-fed, bores its way out, drops to earth, and pupates 1 in. or 2 in. underground. This may be done in autumn, but the more backward larvæ winter in the Galls.

**Remedies.** The most certain is to cut off and destroy the Galls, with their occupants in them. Applications of soot or gas-lime, or other insecticides, to the soil whence infested plants have been lately removed, have

**Turnip Galls**—*continued.*

proved valuable in lessening the prevalence of the Beetles. Other measures against injury will be found mentioned under **Cabbage Gall Weevil**.

**TURNIP, INDIAN.** A common name for *Arisæma triphylla* (which see).

**TURNIP, LION'S.** The roots of *Leontice Leontopetalum*.

**TURNIP MOTHS.** The larvæ of several species of Moths feed on Turnip-plants, some preferring one organ, some another; but the insect which is usually denoted by the name of "Turnip Moth" is one of the *Noctuæ* (see **Moths** and **Noctua**). Its scientific name is *Agrotis segetum*. The popular name is rather misleading, as the larvæ feed on many other plants, including most root crops and numerous weeds. Moreover, several other Moths are almost as hurtful, in the larval state, to the roots of Turnips as is *A. segetum*. The genus *Agrotis* is a large one, and in the same species there may exist great variations in markings and shade of colour; while the species show a great general similarity to one another. The fore wings are long and rather narrow, and

FIG. 134. TURNIP MOTH (*Agrotis segetum*).

the hind wings are pale grey. *A. segetum* (see Fig. 134) reaches 1½ in. to 1¾ in. across the fore wings, which are grey

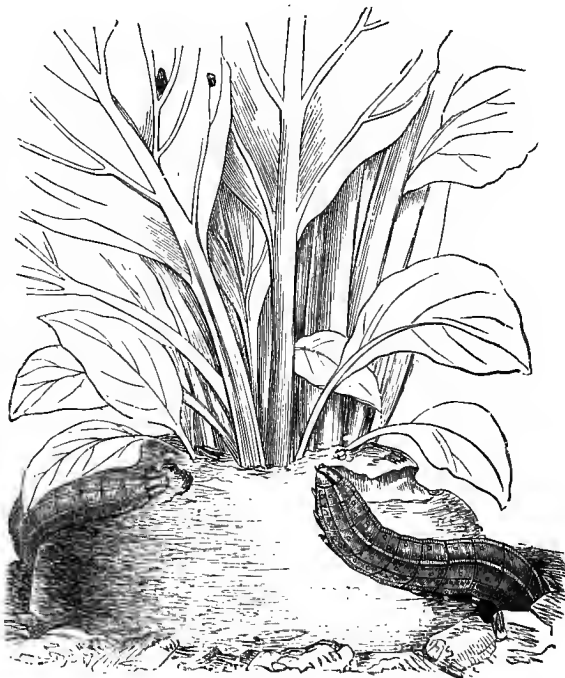


FIG. 135. LARVÆ OF TURNIP MOTH.

**Turnip Moths**—*continued*.

or brownish, sometimes with a yellowish tinge; they are usually darker towards the front margin, and bear obscure, darker marks and cross-lines; the hind wings are pearly-grey. The larvæ are of the form shown in Fig. 135; they are smoky-brown, tinged with pink or purple, with darker lines and small spots, and a paler line down the middle of the back; the head is small, and much narrower than the body. Owing to their habit of living concealed below the surface of the soil, the larvæ are seldom seen. While young, they feed, in the darkness, above ground; and they are especially disposed to gnaw through the base of the stem in young plants, or to remove the bark, if the stems are too large to be gnawed through. They are indiscriminate feeders, devouring almost all kinds of herbaceous plants. In autumn, they often resort to Turnips, boring into the tuberous roots from below, and eating out large cavities, in which they live during the winter, or till food fails. A few become pupæ, in cocoons in the soil, in October; but by far the larger number pupate in spring; and the moths emerge in June.

The Heart-and-Dart Moth (*Agrotis exclamatoris*) is very similar to, and almost as destructive as, the Turnip Moth. The larvæ of the two species are so much alike that it requires a skilled entomologist to distinguish the one from the other; but this is of little moment to gardeners and farmers, as they are as much alike in habits and in destructive powers as they are in appearance.

The larvæ of a good many more species of *Noctua* occasionally feed on the roots, leaves, or stems of Turnips, but they are so seldom the cause of perceptible injury to these plants that it is unnecessary to discuss them here.

**Remedies.** Such larvæ as feed on the leaves of Turnips are best combated by the means detailed under **Turnip Sawfly**. Those larvæ that frequent the roots are not easily reached when they have bored into the Turnips. The time when they can be destroyed, or kept in check, with most hope of success, is in autumn, while they are still living concealed during the day, but come out to feed at night. Hand-picking, by the light of a lantern, is too slow, except to protect choice plants. Soot and gas-lime have been found useful, applied round the top of the root of each plant; and the same is true of gas-water poured on the soil. Ploughing or digging the ground, during winter, is useful by turning up the larvæ and exposing them to rooks and to other insectivorous birds, which are, in truth, the agriculturist's best allies against foes of this sort.

**TURNIP RADISH.** See **Radish**.

**TURNIP-ROOTED CELERY.** See **Celeriac**.

**TURNIP, ST. ANTHONY'S.** A common name for *Ranunculus bulbosus* (which see).

**TURNIP SAWFLY** (*Athalia spinarum*). One of the most dangerous enemies to Turnips in many years, since the larvæ (known as "Niggers," or "Black Palmers," because of their dark colour) frequently appear in myriads in the fields, and devour the leaves of the young plants. Often a second sowing has been rendered necessary; and even a third or a fourth has been required at times. The perfect insects are Sawflies (see **Tenthredinidæ**), about  $\frac{1}{2}$  in. or  $\frac{3}{4}$  in. long, and rather heavy in form. Their ground-colour is clay-yellow, covered with dense, whitish, short hairs. The antennæ, head (except white mouth), spots on thorax, and tips of shanks and of joints of the feet, are black. The wings are transparent, with nerves (except at base) dark. The female lays about 250 eggs, often from ten to twenty on a single leaf, along the margins. The eggs hatch in from six to twelve days. The larvæ at

**Turnip Sawfly**—*continued*.

first are white, with two black dots on the head; but when nearly full-fed they are black above, paler below, with slate-coloured and black spots on the sides. There are usually several folds of skin, but no hairs, on the body. Often many occur on each leaf, and the leaves are gnawed away to the ribs by them. In about three weeks they reach their full size, and then burrow underground, and form oval cocoons. In these the summer broods lie about three weeks, when they emerge as Sawflies. There are usually three broods of Sawflies each year—in May, July and August, and September. They are partial to flowers, but also sit underneath the leaves of Turnips in dull weather, and may be caught by sweeping the plants with a net. They have been observed to proceed from district to district, beginning at one side of a field, and crossing it to the other, in regular succession. When the larvæ are very numerous, the Turnips are almost wholly eaten down, and suffer so much that the crop is rendered nearly worthless.

Besides the well-known *A. spinarum*, another Sawfly does almost as much harm to Turnips in the larval stage. This is *A. ancilla* (also called *A. glabricollis*). The insects are much like *A. spinarum*; but their ground-colour is reddish or clay-yellow, and they are not hairy. The larvæ of the two species are very much alike, and it is probable that those of *A. ancilla* are often wrongly ascribed to *A. spinarum*. The remedies recommended below are beneficial against both species.

**Remedies.** Disturbing the larvæ when about to pupate, prevents this latter change, and the insect dies. It is also well to disturb them when changing their skins, as this is seriously hurtful to them, and destroys many. With this object, the plants may be brushed over with a rope, or with such branches as those of Firs, &c., and the larvæ thrown to the ground may be crushed; or quicklime or gas-lime may be sprinkled on the soil around the plants. Anything that will promote the rapid growth of the Turnip-plants is valuable, as diminishing the risk of injury; hence, watering or irrigating the plants with liquid manure, or even with pure water alone, is advisable, and has the further advantage of being directly injurious to the larvæ. Ad-vantage is recommended, as part of the crop usually escapes, unless the larvæ are excessively numerous; but it brings with it serious drawbacks. Ducks have been employed with advantage to reduce the numbers of larvæ, and have, at times, saved the crops; but they are apt to suffer from eating the larvæ in quantities, becoming affected with diarrhœa, and getting very thin.

**TURNIP-SEED WEEVIL** (*Ceuthorrhynchus assimilis*). A small Weevil, closely related to, and very much like, the gall-makers of the same genus (*C. sulcicollis*), known as **Cabbage Gall** or **Turnip Gall Weevils** (which see). It differs from the latter in the grey colour due to the pale hairs or scales scattered all over its dark body, and in the hinder thighs not being toothed on the inner side; and it is also slightly smaller. Its life-history is as follows: The Beetles usually emerge from the pupæ in autumn; they pass the winter in shelter, and may be found, in spring and early summer, on flowers of Cabbages, Turnips, and other cultivated or wild *Crucifera*, feeding upon the flowers. The females lay their eggs in the immature fruits; and the larvæ feed on the seeds, and, when full-fed, bore out of the seed-vessels, fall to the ground, and burrow into it, there to become pupæ.

**Remedies** must be confined to the capture of the Beetles, by nets or otherwise, on the flowers, since the habits of the larvæ, and the situation of the pupæ, almost preclude other means of capturing them freely.

**TURNSOLE.** See **Heliotropium**.

**TURPENTINE-TREE.** A common name for various species of *Abies*, *Pinus*, *Pistacia*, &c.

**TURPENTINE VESSELS.** "Tubes formed in the interstices of tissue, into which turpentine or such secretions are naturally drained during the growth of a plant. They are common in Conifers" (Lindley).

**TURPINIA** (named in honour of P. Turpis, French botanical artist and naturalist, who died in 1840). *Syns.* *Dalrymplea*, *Eyrea*, *Lacepedea*, *Ochranthe*, *Tricerata*. *ORD.* *Sapindaceæ*. A genus embracing about eight species of stove or greenhouse, glabrous trees or shrubs, inhabiting India, the Indian Archipelago, China, the West Indies, and the northern provinces of South America. Flowers white, small, in spreading, axillary and terminal panicles; calyx five-cleft; petals five, orbicular, sessile, imbricated; stamens five. Fruit nearly globose, three-celled. Leaves opposite, exstipulate, imparipinnate or very rarely simple; leaflets opposite, serrated, sometimes stipellate, coriaceous. Branchlets terete. The species known in gardens are here described. They thrive in a compost of peat, loam, and sand. Propagation may be effected by ripened cuttings, inserted in sand, under a glass, in heat.

**T. arguta** (sharp). *fl.* dirty-white, or purplish when in bud; inner sepals and petals oblong-ovate, about equal in length, the two outer sepals rather smaller; panicle dense, terminal. March. *l.* slightly crenate, 5in. to 6in. long, glabrous. *h.* 3ft. to 4ft. China, 1826. Greenhouse shrub. *SYN.* *Ochranthe arguta* (B. R. 1819).

**T. insignis** (remarkable). *fl.* sweet-scented; calyx segments unequal; petals very shortly unguiculate; panicle terminal. May. *l.* serrulated. *h.* 20ft. Mexico, 1847. A handsome, stove tree. *SYN.* *Lacepedea insignis*.

**T. nepalensis** (Nepaul). A synonym of *T. pomifera*.

**T. occidentalis** (Western). Cassava Wood. *fl.*, primary divisions of the panicle racemiform, opposite, bearing small corymbs, of which the upper ones are usually alternate. May. *fr.* dark blue. *l.*, leaflets two or three pairs, elliptic-oblong, crenate or serrate, glabrous, petiolulate, stipellate. *h.* 20ft. to 30ft. West Indies, 1824. Stove tree.

**T. pomifera** (apple-bearing). *fl.*, primary branches of the panicle opposite. May. *fr.* red, purplish, yellow, or green, ½ in. to ¾ in. in diameter. *l.* 5in. to 20in. long; leaflets three to nine, elliptic, oblong, or ovate, acuminate, 2½ in. to 8in. long. *h.* 25ft. or less. India and China, 1820. Stove shrub or tree. (B. F. S. 159, under name of *T. nepalensis*.)

**TURPINIA** (of Persoon). A synonym of *Poiretia* (which see).

**TURRÆA** (named in honour of George Turra, 1607-1688, Professor of Botany at Padua, and author of several botanical works). *ORD.* *Meliaceæ*. A genus comprising about sixteen species of stove or greenhouse trees or shrubs, inhabiting tropical and South Africa, tropical Asia, and Australia. Flowers white, elongated; calyx four or five-toothed or parted; petals four or five, elongated, free, twisted; staminal tube cylindrical, four or five-toothed; anthers four or five, included or exserted; disk absent; peduncles axillary, few-flowered, many-bracted. Leaves alternate, petiolate, entire or obtusely lobed. The best-known species are here described. A compost of loam and peat is most suitable for their culture. Propagation may be effected by cuttings of ripened wood, with the leaves intact, inserted in sand, under a glass, in heat.

**T. heterophylla** (variable-leaved). *fl.* clustered at the ends of the branches; petals ten to fourteen lines long, shorter than the style; peduncle silky-tomentose, three to eight lines long. May. *l.* short-stalked, ovate, acute or obtusely pointed, 2in. to 3½ in. long, undivided or sub-trilobed, the young ones pubescent beneath. Upper Guinea, 1843. Stove shrub. (B. R. xxx. 4, under name of *T. lobata*.)

**T. obtusifolia** (obtusely-leaved).\* *fl.* on solitary, axillary peduncles six to ten lines long; petals glabrous, ligulate, 1in. to 1½ in. long. May. *l.* obovate, 1in. to 1½ in. long, narrowed into short petioles, entire or obtusely three-

*Turræa*—continued.

lobed, with revolute margins, glabrous on both sides, paler beneath. Branches glabrous. *h.* 4ft. to 6ft. South Africa, 1872. Greenhouse shrub. (B. M. 6267.)

**T. rigida** (rigid). *fl.* in sessile fascicles from nodes of branches or old wood; corolla ½ in. to 1in. long, tubular, at first silky on the outside. April. *l.* alternate, short-stalked, entire, firm, obtuse or acute, 4in. to 6in. long, pinninerved. Mauritius, 1816. A glabrous, stove bush or tree.

**TURRITIS.** Included under *Arabis*.

**TURTLE HEAD, or TURTLE BLOOM.** See *Chelone*.

**TUSSACA.** A synonym of *Goodyera* (which see).

**TUSSACIA** (named after F. R. de Tussac, a French botanist, who wrote a Flora of the Antilles in 1803). *SYN.* *Chrysothemis*. *ORD.* *Gesneraceæ*. A small genus (four or five species) of stove herbs, with creeping, simple or branched rhizomes, natives of the West Indies, Guiana, and Columbia. Calyx often scarlet, free, ample, campanulate, five-angled or five-winged; corolla yellow, lined with purple, the tube rather broadly cylindrical, the limb oblique, erecto-patent, broadly five-lobed; stamens included; peduncles umbellately many-flowered, in the upper axils, disposed in a terminal corymb. Leaves opposite, often ample; upper floral ones reduced to bracts. The only species introduced are here described. Both are perennials. For culture, see *Gesnera*.

**T. nitida** (shining). A synonym of *Catopsis nitida*.

**T. pulchella** (pretty).\* *fl.*, calyx red, the lobes deltoid, serrated; corolla nearly regular, 1in. to 1½ in. long, the tube erect, cylindrical, half as long again as the calyx. July. *l.* ovate or ovate-oblong, acute, 3in. to 7in. long, crenate-serrate above the narrow-cuneate base, scarcely petiolate. *h.* 1ft. West Indies, 1830. *SYN.* *Besleria pulchella* (B. M. 1146; L. B. C. 1028).

**T. semi-clausa** (half-closed). *fl.*, calyx cinnabar-red, campanulate, truncate; corolla golden-yellow, radiately striped with crimson-purple; umbels forming short, terminal panicles. *l.* broadly ovate, pubescent, dentate-ciliate, bright green. Stems branching, fleshy, spotted with red. Brazil, 1870. A showy plant. (I. H. ser. iii. 28.) In some varieties, the stems and petioles are violet-coloured.

**TUSSILAGO** (the old Latin name used by Pliny, and derived from *tussis*, a cough; alluding to the medicinal use of the leaves). Coltsfoot. *ORD.* *Compositæ*. A monotypic genus. The species, *T. Farfara*, is a British, scapigerous herb, with rather large, yellow flowers and cobwebby leaves. As the flower-head dies away, the scape lengthens, and finally bears a head of white, serrated pappus hairs. The leaves are used for cigar making, and are smoked in cases of asthma. The species and its variety thrive in any soil, and, if required, may be propagated by cutting up the long, creeping rhizomes. Other plants formerly included here will be found under *Homo-gyne*, *Petasites*, &c.



FIG. 136. TUSSILAGO FARFARA VARIEGATA.

**Tussilago**—*continued*.

**T. Farfara variegata** (variegated Coltsfoot). \* *l.* large, broadly cordate, angled or lobed, toothed, margined or blotched with creamy-white. A pretty plant, but not one which should be indiscriminately introduced into gardens, as its creeping roots give much trouble at times. See Fig. 135.

**TUSSOCK MOTHS.** Species of *Bombycina*, nearly related to the Vapourer Moths (see *Orgyia antiqua*). By some entomologists they are included in the genus *Orgyia*; but most separate them from that genus because the females of the Tussocks have full-sized wings, while those of the Vapourer Moths are almost wingless. The Tussocks are placed in a genus named *Dasychira* (from *dusus*, hairy, and *cheir*, the hand, or fore limb; in allusion to the hairs on the first pair of legs). There are two British species, generally known as the Pale Tussock (*D. pudibunda*), or Hop-dog, and the Dark Tussock (*D. fascelina*). The males have the antennæ much fringed; while in the females they are nearly simple. In both sexes the body is heavy, and the wings are rather broad. The front pair of legs are hairy, especially in the male. The larvæ resemble those of the Vapourer Moths in having erect, brush-like tufts of hair on the middle line of the back, from the fifth to the eighth segments, and a backward-pointing tuft on the back of the twelfth segment. When full-fed, the larvæ spin slight cocoons among their food-plants, and become hairy pupæ.

The Pale Tussock (*D. pudibunda*) is about 2in. or 2½in. in spread of the fore wings. Its general colour is grey, with three narrow, dark bands across the fore wings; or, in the male, a broad, smoke-coloured cross-bar, with darker, waved lines. The hind wings are pale grey, with a faintly darker bar. The larva is pale green, with a deep black, velvety band on the back between each two segments from the fifth to the eighth; the tufts of erect hairs on the back are yellow. The larvæ live on many trees, such as Beech, Chestnut, Lime, and Oak, and they also feed on Hops, whence the name "Hop-dog," often applied to them.

The Dark Tussock (*D. fascelina*) seldom exceeds 1½in. across the front wings, which are smoky-grey, with three wavy, blackish cross-bars; two of these lie close together beyond the middle of the wing. The hind wings are smoky-grey, as are also the head and body. The larvæ are dark grey, with lemon-yellow hairs, but the tufts on the back are nearly black instead of yellow. The larvæ feed occasionally on Plum and other fruit-trees, on Hazel, Heather, Oak, and various herbs. They are, however, seldom the cause of serious injury, hardly ever being abundant.

**Remedies.** Hand-picking, or shaking the larvæ from the branches on to sheets of paper or cloth, will prove sufficient to prevent harm, should it be threatened at any time.

**TUTSAN.** See *Hypericum Androsæmum*.

**TWEEDIA.** A synonym of *Oxypetalum* (which see).

**TWIN FLOWER.** See *Bravoa geminiflora*.

**TWISTED STALK.** See *Streptopus*.

**TYCHIUS QUINQUE-MACULATUS.** Larvæ of a Weevil known by this name feed in the seeds of Peas and other *Leguminosæ*. During summer, when full-fed, they fall to the soil, and become pupæ in it. The Beetles emerge from the ground in autumn, live in concealment during winter, and, in summer, the females lay eggs in the flowers, or, rather, in the ovaries of the

**Tychius quinque-maculatus**—*continued*.

flowers, of the food-plants. The Beetles are about ¼in. long, and are elongate-ovate in form. The beak is long, and curves downwards. The colour is black, with ruddy or yellow scales above, a white line down the middle of the thorax, and a white spot, and white inner border, on each wing-case; the body is pure white below. The thighs are toothed, and black; the rest of the legs, and the antennæ, are dull-red. The Beetles are not very common in England, which is fortunate, as it is difficult to apply a remedy—at least, while the larvæ are in the pods. A dressing of soot along the rows of Peas, towards the end of summer and autumn, would probably be of service against the pupæ in the soil.

**TYDÆA** (named after Tydeus, a son of Æneus, King of Calydon). ORD. *Gesneraceæ*. A small group of stove herbs, natives of tropical America, now included under *Isoloma*. The species hybridise freely, and many crosses have received distinctive names in continental gardens. For culture of the plant described below, see *Gesnera*.



FIG. 137. UPPER PORTION OF PLANT OF TYDÆA AMABILIS.

**T. amabilis** (lovely). *fl.* dark rose-coloured; corolla large, very villous, the limb of five unequal, rounded lobes, dotted with purple, the oblique tube paler-coloured within, but marked with larger dots and blotches; peduncles axillary, solitary, as long as, or the upper ones much longer than, the leaves, erect, purple below. Spring. *l.* opposite, ovate, bluntly serrate-toothed, somewhat acuminate, dull green above, pale beneath. Stem 1ft. to 2ft. or more high, greenish-purple. New Grenada, 1855. Whole plant hairy. See Fig. 137. (B. M. 4999.)

**TYLE BERRY.** A common name for *Jatropha multifida* (which see).

**TYLOCHILUS.** A synonym of *Cyrtopodium* (which see).

**TYLOGLOSSA.** A synonym of *Justicia* (which see).

**TYLOPHORA** (from *tylos*, a swelling, and *phoreo*, to bear; probably in reference to the coronal lobes). Including *Hybanthera*. ORD. *Asclepiadaceæ*. A genus comprising about forty species of stove, twining or rarely sub-erect sub-shrubs or herbs, inhabiting tropical and sub-tropical Africa, Asia, and Australia, New Caledonia, and Norfolk Island. Flowers rather small, sometimes minute; calyx deeply five-cleft or five-parted; corolla tube short, sub-rotate, deeply five-cleft, the lobes rather broad; coronal lobes five, fleshy; cymes umbelliform or shortly racemose. Leaves opposite. The species are not very ornamental. Only three call for description here; they are all twining sub-shrubs. For culture, see *Hoya*.

**T. asthmatica** (anti-asthmatic). East Indian Ipecacuanha. *f.* green, rather large, on long pedicels; corolla segments acute, peduncles shorter than the leaves, bearing two or three sessile, few-flowered umbels towards the apex. November. *l.* ovate or nearly round, acuminate, often cordate at base, glabrous above; petioles glandless, sub-terete. *h.* 5ft. India, 1814. (B. M. Pl. 177; B. M. 1929, under name of *Cynanchum viridiflorum*.)

**T. barbata** (bearded). *f.* dingy-purple, not numerous, in one or rarely two umbels; corolla  $\frac{1}{2}$  in. broad, slightly bearded inside. July. *l.* on slender petioles, ovate or ovate-lanceolate, acute, not cordate, lin. to  $\frac{1}{2}$  in. long. *h.* 10ft. Australia, 1822.

**T. grandiflora** (large-flowered). *f.* purple, one to three on a short, interpetiolar peduncle; corolla  $\frac{1}{2}$  in. across, the lobes obtuse. July. *l.* on slender petioles, ovate to ovate-lanceolate, shortly and acutely acuminate, more or less cordate, lin. to  $\frac{1}{2}$  in. long, pubescent. *h.* 10ft. Australia, 1822.

**TYMPANANTHE.** A synonym of *Dictyanthus* (which see).

**TYPHA** (the old Greek name used by Theophrastus). Bullrush; Cat's Tail; Club-rush; Reed Mace. ORD. *Typhaceæ*. A genus comprising about ten species of slender or robust, stove or hardy, marsh-loving herbs, found in tropical and temperate regions. Male and female spadices similar, superposed, nearly terminating the peduncle, caducous or remote, naked or with a very caducous, stipitate spathe; peduncle erect, terete, straight, slender or robust, undivided. Radical leaves elongated-linear, rather thick and spongy; cauline ones few, shorter. The two British species, which thrive in rivers, ditches, and ponds, are here described. They may be increased by seeds, sown in a pot plunged nearly to the level of the soil in water; or by division of the rhizomes.

**T. angustifolia** (narrow-leaved). Small Bullrush. *f.* brown; spikes  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in diameter, separated by  $\frac{1}{2}$  in. to lin., the female often interrupted. July. *l.*  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. broad, dark green, not glaucous, convex beneath, channelled towards the base. Plant smaller in all its parts than *T. latifolia*. (Sy. En. B. 1366.)

**T. latifolia** (broad-leaved). Cat-o'-nine-tails; Marsh Beetle; Reed Mace, &c. *f.* dark brown; spikes  $\frac{1}{2}$  in. to nearly  $\frac{1}{2}$  in. long, lin. in diameter, contiguous or nearly so, silky from the copious filiform perianth scales. July and August. *l.* distichous,  $\frac{3}{4}$  ft. to  $\frac{1}{2}$  ft. long,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. broad, linear, obtuse, nearly flat, sub-glaucous. Stem  $\frac{3}{4}$  ft. to  $\frac{1}{2}$  ft. high, terete. (Sy. En. B. 1385.)

**TYPHACEÆ.** A small natural order of aquatic or marsh-loving herbs, with perennial rhizomes, inhabiting Europe, temperate and tropical Asia, Australia, and temperate North America. Flowers small, inserted on a monœcious spadix, or by abortion diecious, in heads or dense spikes; perianth none; stamens of the males numerous, accompanied by bristles or membranous scales; anthers two-celled; ovaries of the females accompanied by bristles or scales, sessile, or on long stalks when ripe. Fruits membranous or sub-drupaceous, one or rarely two-celled, sessile or stipitate. Leaves alternate, linear, entire, erect and emerging or floating, sheathing at base; cauline ones subtending the spadices, or forming an involucre before flowering. Stems cylindric, not

### **Typhaceæ—continued.**

knotty, solid, simple or branched. The pollen of *Typha* is made into bread by the natives of Scind and New Zealand. Only a couple of genera—*Sparganium* and *Typha*—and sixteen species are included in this order.

**TYPHONIUM** (from *Typhon*, a mythological giant; the name was given by the ancients to some Aroid). Including *Heterostalis*. ORD. *Aroideæ* (*Araceæ*). A genus embracing about thirteen species of stove, tuberous, perennial herbs, inhabiting tropical Asia, Australasia, and the Pacific Islands. Flowers monœcious, the males and females remote; spathe tube convolute, accrescent, persistent, the throat constricted, the lamina ovate or lanceolate, acute or acuminate, erect or recurved, deciduous; spadix sessile or stipitate, included, the appendage variable, often stipitate; peduncle usually short. Leaves cotemporary with the flowers, sagittate or hastate, three to five-lobed or parted, or pedatisect, the petiole elongated. The species known to cultivation are described below. They thrive in light, rich soil, and during the growing season require an abundant supply of water. After the leaves have died down, water must be withheld until growth recommences. The pots containing the tubers can be stored away in any dry, warm place. Propagation is effected by division of the tubers.

**T. Brownii** (Brown's)\* *f.* spathe with the convolute base ovoid, the lamina  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long, very broad, of a deep purple inside; male and female spikes about  $\frac{1}{2}$  in. long, lin. distant; peduncle shorter than the petiole. April. *l.* divided into three narrow or broad-lanceolate lobes or segments, the lateral ones horizontally divaricate,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long, the middle one usually rather longer and narrower; petioles  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long. Australia, 1875. (B. M. 6180.)

**T. cuspidatum** (cusped). *f.* spathe tube green, ovoid or oblong; lamina lanceolate, prolonged into a whip-like process, or shorter and acuminate; spadix whitish, shorter or longer than the lamina, sometimes very long, the appendix very shortly stipitate, conico-subulate; peduncle slender, scarcely one-third the length of the petioles. *l.* sagittate or hastate, oblong and scarcely cordate at base, or three-lobed or parted; petioles three or four times longer than the blades. *h.* 1ft. Bengal, Java, &c., 1819. SYN. *Arum flagelliforme* (L. B. C. 396).

**T. divaricatum** (divaricate). *f.* spathe tube oblong-ovoid, the lamina dark purple, ovate, long-acuminate; peduncle usually short. July. *l.* cordate or hastate-sagittate, somewhat three-lobed; middle lobe somewhat ovate or oblong-ovate, acute or acuminate, twice as long as the ovate or lanceolate lateral lobes; petioles slender, twice as long as the blades. *h.* 2ft. East Indies, 1759. SYNS. *T. trilobatum* (of Curtis), *Arum divaricatum*, *A. trilobatum* (B. M. 339; L. B. C. 516), *A. t. auriculatum* (B. M. 2324).

**T. diversifolium Huegelianum** (Huegel's variable-leaved). *f.* spathe erect,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long; lamina rich velvety purplish-brown inside, reticulated with pale green at base and apex; spadix shorter than the spathe; appendix  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long, blackish; ovaries purple; stigmas white. *l.* one or two, very variable in form, sagittate, hastate, or five-lobed, with the basal lobes directed upwards. Himalayas, 1879. SYN. *Heterostalis Huegeliana*.

**T. trilobatum** (three-lobed). *f.* spathe tube oblong; lamina greenish outside, rose-purple within, oblong-ovate, acuminate, four times as long as the tube; spadix with a terete, conical, shortly stipitate appendix; peduncle slender, one-third the length of the petioles. *l.* hastate, sub-tripartite; lobes all broadly ovate, acuminate; petioles nearly twice as long as the blades. *h.* 1ft. East Indies, 1714. SYNS. *Arum ortense* (A. B. R. 356; B. R. 450; L. B. C. 422).

**T. trilobatum** (three-lobed), of Curtis. A synonym of *T. divaricatum*.

**TYTONIA** (named after Arthur Tyton, by whom many of the oldest inhabitants of our gardens were preserved). ORD. *Geraniaceæ*. A monotypic genus, the proper name of which, according to the authors of the "Genera Plantarum," is *Hydrocera*. The species is a beautiful, stove aquatic. It should be grown in rich, loamy soil, in large pots or pans of water, and placed in a warm part of the stove. The plant may be increased by seeds, sown in spring.

**T. natans** (swimming). Water Balsam. *f.* beautifully variegated with red, white, and yellow, large, irregular; sepals five, coloured; petals five, the outer front ones largest, concave; stamens five; peduncles axillary, short, one to three-flowered. July to September. *l.* alternate, narrow. Tropical Asia, 1810. SYN. *Hydrocera triflora*.



**UCRIANA.** A synonym of *Tocoyena* (which see).

**UDORA.** A synonym of *Elodea* (which see).

**UGENA.** Included under *Lygodium*.

**UGNI.** Included under *Myrtus* (which see).

**ULEX** (an old Latin name used by Pliny for some similar shrub). Furze; Gorse; Whin. Including *Stauracanthus*. ORD. *Leguminosæ*. A genus embracing not more than a dozen species of mostly hardy shrubs, with very spiny branchlets, found in Western Europe and North-western Africa. Flowers yellow, solitary or shortly racemose in the axils of the spines or scales towards the tips of the branchlets; calyx membranous, coloured, two-parted; petals shortly clawed; standard ovate; bracts small. Leaves spinose or reduced to small scales. *U. europæus* and *U. nanus* are well-known, ornamental, British plants. All thrive in ordinary soil, and may be increased by cuttings, or by seeds.

**U. europæus** (European). Common Furze; Gorse; Thorn Broom, &c. *fl.*  $\frac{1}{2}$  in. long, odorless; calyx hairs black, spreading; bracts ovate. February and March; August and September. *l.* small; leaflets hairy. Spines sometimes furnished with minute, one-foliate leaves. Branches spreading. *h.* 2ft. to 3ft. Western Europe, &c. (Sy. En. B. 323.) *fl. pleno* is a beautiful, double-flowered variety. The form *strictus* (Irish Furze) has erect branches.

**U. Gallii** (French). A variety of *U. nanus*.

**U. genistoides** (Genista-like). Portuguese Furze. *fl.* axillary or terminal, solitary; standard and keel tomentose outside; wings narrow, much spreading. August. *l.* small, scale-like, spiny, glabrous. Branches rigid, decussate. *h.* 1ft. to 3ft. Mediterranean region, 1823. Half-hardy. (B. R. 1452.) SYN. *Stauracanthus aphyllus*.

**U. nanus** (dwarf). Cat Whin; Tam Furze. *fl.*  $\frac{1}{2}$  in. long, more racemose than in *U. europæus*; calyx adpressedly pubescent. July to November. *fr.* persistent till the following season. Spines  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long. Stems 1ft. to 3ft. high; branches drooping. England, Belgium, France.

**U. n. Gallii** (French). Primary spines rigid, longer than those of *U. nanus*. Branches ascending. (F. d. S. 441 b and Sy. En. B. 324, under name of *U. Gallii*.)

**ULIGINOSÆ.** Inhabiting swampy places.

**ULLOA.** A synonym of *Juanulloa* (which see).

**ULLUCUS** (from *Ulluco*, the Quitan name). SYN. *Mellica*. ORD. *Chenopodiaceæ*. A monotypic genus. The species is a half-hardy, fleshy, decumbent and twining herb, its creeping rhizome and angular stem emitting tuber-bearing roots. It is extensively grown in the mountains of Peru and Bolivia for the sake of its small tubers. As a substitute for the Potato, the plant has been unsuccessfully tried in this country. It thrives in any light soil, and may be increased by its tubers.

**U. tuberosus** (tuberous-rooted). *fl.* golden, in ample, axillary, loose-flowered racemes; perianth rotate, five-parted, with a very short tube; bracts at the bases of the pedicels lanceolate, persistent; bracteoles below the flowers very conspicuous. June. *l.* alternate, on thick petioles, rounded-cordate, acute, entire. *h.* 1ft. Andes of South America, 1846. (B. M. 4617; G. C. n. s., xxiii., p. 216; L. J. F. 221.)

**ULMÆ.** A tribe of *Urticaceæ*.

**ULMUS** (the old Latin name used by Virgil, &c.). Elm. ORD. *Urticaceæ*. A genus comprising about sixteen species of hardy, unarmed trees, broadly dispersed over north temperate regions, extending in Asia to tropical mountains. Flowers polygamous, mostly hermaphrodite, fascicled; perianth loosely campanulate, four to nine (often five) cleft, the lobes imbricated; stamens four to eight (often five); filaments erect, at length exserted. Fruit a one-seeded samara. Leaves alternate, distichous, serrated, pinniveined, deciduous or sub-perennial; stipules lateral, scarious, very caducous. Elm wood is rather hard, and reddish; it is used specially for wheelwrights' work, shafts, axletrees, screws for presses, &c. Exotoses or wens are often developed on Elm-trunks, which acquire great hardness, and are much sought for by cabinet-makers, from the different patterns exhibited by the twisted arrangement of their wood fibres. Elm-trees arrive at perfection

**Ulmus**—continued.

in 150 years, but they will live for more than four times that period. They were held in high estimation by the ancients, not only on account of their leaves, which were dried and used as fodder, but also on account of their being used as props for Vines. The common Elm (*U. campestris*) grows very rapidly in light, rich land; but its wood is proportionately light and porous, and of little value compared with that grown on strong land, which is of a closer and stronger texture, and at the heart will have the colour, and almost the hardness and weight, of iron. Propagation is effected by layers, suckers, grafting, and budding. Layers are usually made in autumn, or in the course of the winter, and become rooted, or fit for removal, in the course of a year. Suckers are produced in abundance by some of the species and varieties, and afford a ready means of increase. Whip or splice-grafting is best performed, close to the root, in spring; the plants thus treated make shoots of 3ft. or 4ft. in the same year, and never throw up suckers, unless the graft is buried in the soil. The Scotch Elm (*U. montana*) luxuriates in a deep, rich loam; but it becomes most valuable in a sandy loam lying on rubble-stone or on dry rock. It is most readily propagated by seeds; these may be sown as soon as ripe (about the middle of June), in which case many plants will be obtained in the same season; or they may be dried in the shade, and stored in bags or boxes, in a dry place, until the following March or April. *U. americana* delights in a low, humid situation. Its wood is inferior to that of the common Elm. The species best-known to cultivation are here described; all have brownish flowers, appearing from March to May.

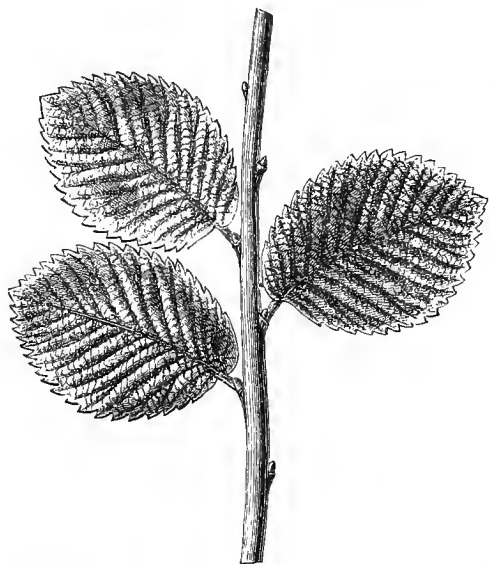


FIG. 138. LEAF AND FRUIT-BEARING TWIGS OF *ULMUS CAMPESTRIS*.

**U. alata** (winged). Wahoo or Winged Elm. *fl.* on slender, drooping, jointed pedicels or peduncles; perianth segments obovate. *fr.* ovate or oval, downy on the face, at least when young, fringed-ciliated. *l.* ovate-oblong and oblong-lanceolate, acute, rather thick, *lin.* to 2½ in. long, smooth or nearly so above, downy beneath. Branches (at least some of them) corky-winged; branchlets and bud-scales nearly glabrous. *h.* 30ft. to 40ft. North America, 1820.

**Ulmus**—continued.

**U. americana** (American)\* American or White Elm. *fl.* in close fascicles, on slender, drooping peduncles or pedicels, which are jointed above the middle; perianth seven to nine-lobed; fascicles close. *fr.* oval or ovate, glabrous, except on the margins,  $\frac{1}{2}$  in. long. *l.* obovate-oblong or oval, abruptly acute, sharply and often doubly serrated, 2 in. to 4 in. long, smooth or nearly so above, softly pubescent or soon glabrous beneath. Branches not corky; branchlets and buds glabrous. *h.* 80 ft. to 100 ft. North America, 1752. An ornamental tree. (T. S. M. p. 322.)

FIG. 139. YOUNG SHOOT OF *ULMUS CAMPESTRIS ROTUNDIFOLIA*.

**U. campestris** (field-loving)\* Alme; Aume-tree; common Elm. *fl.*, perianth smaller than in *U. montana*; stamens often four. *fr.* usually obovate. *l.* 2 in. to 3 in. long, less cuspidate than in *U. montana*, often narrow at base, scabrid above and pubescent beneath, or nearly glabrous. Trunk attaining 20 ft. in girth, with rugged bark; root sending up abundant suckers. *h.* 125 ft. Europe (Britain). See Fig. 138. (B. M. Pl. 232.) *SYN.* *U. carpinifolia*. *U. glabra* and *U. suberosa* are regarded, by Hooker, as mere varieties of this species; but for gardening purposes they are kept distinct in this work.

**U. c. acutifolia** (acute-leaved). *l.*, in old specimens, more tapering, and branches more pendulous, than in *U. c. alba*, which this variety otherwise resembles.

**U. c. antarctica** (Antarctic). A graceful, small-leaved form, somewhat resembling *U. c. viminalis*. The name of this form is very inappropriate, as there are no Elms in the Southern hemisphere.

**U. c. aurea** (golden). This is one of the most distinct and desirable of all the ornamental Elms; it has foliage like that of *U. c. antarctica*, but of a uniform golden-bronze colour. (B. H. 1866, 19; I. H. 513.) *SYN.* *U. Roseae*.

**U. c. Berardi** (Berard's). A distinct and pretty form, of somewhat erect habit, with small, rather rigid leaves. This originated as a seedling in the nurseries of Simon-Louis Bros., near Metz.

**U. c. betulæfolia** (Birch-leaved). *l.* somewhat resembling those of the common Birch.

**U. c. chinensis** (Chinese). A low and rather tender bush. China.

**U. c. concavæfolia** (concave-leaved). This is scarcely distinct from *U. c. cucullata*.

**U. c. cornubiensis**. Cornish Elm. *l.* small, strongly veined, coriaceous. Branches bright brown, smooth and somewhat flexuous when young, and very compact, becoming upright with age. "This variety, in the climate of London, is a week or a fortnight later in coming into leaf than the common Elm, from which, and from all other varieties, it is readily distinguished by the bark of old trees, which never scales off, but tears asunder, exhibiting its fibrous construction, in the manner of the bark of the Sweet Chestnut. There are many fine trees of this variety in Kensington Gardens." (London.)

**U. c. cucullata** (hooded). *l.* curiously curved, something like a hood.

**Ulmus**—continued.

**U. c. foliis-variegatis** (variegated-leaved). *l.* striped with white, very ornamental in spring.

**U. c. latifolia** (broad-leaved). *l.* broader than in the species, and expanding very early in spring.

**U. c. nana** (dwarf). This very distinct variety is said not to grow above 2 ft. high in ten or twelve years.

**U. c. parvifolia** (small-leaved). A very common variety in all the woods of the South of Russia, and varying in height from that of a medium-sized tree to that of a diminutive shrub, according to soil and climate.

**U. c. planifolia** (flat-leaved). A handsome, small tree, closely resembling *U. c. parvifolia*.

**U. c. rotundifolia** (round-leaved). This form is characterised by its roundish-oval or sub-orbicular leaves. See Fig. 139.

**U. c. sarniensis**. Jersey Elm. A free-growing variety, differing very little from the type.

**U. c. stricta** (upright). Red English Elm. One of the most valuable timber-trees of the small-leaved kinds; growth very rigid. The timber is of excellent quality, and the tree forms poles of equal diameter throughout.

**U. c. tortuosa**. Twisted Elm. This is the only Elm that grows freely from cuttings. The wood of the tortuous parts of the trunk is valuable for the naves of wheels.

**U. c. umbraculifera** (umbrella-bearing). A compact-growing form, with a dense, umbrella-like head.

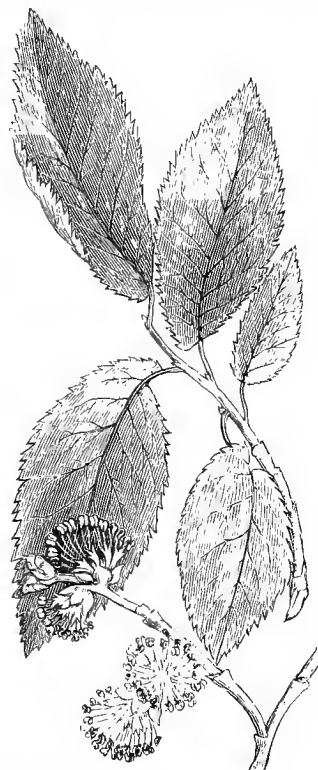
**U. c. viminalis** (twiggy). *l.* small. Branches numerous, slender, twig-like. A very distinct and elegant variety.

**U. c. virens** (green). Kidbrook Elm. "Almost evergreen in a mild winter; and, as such, is the most ornamental tree of the genus. It must not, however, be depended upon as a timber-tree, because, in some autumns, the frost kills the shoots. The bark is, red, and the tree of spreading habit. This, like *U. c. stricta*, grows well upon chalk." (London.)

**U. carpinifolia** (Hornbeam-leaved). A synonym of *U. campestris*.

**U. effusa** (effuse). A synonym of *U. pedunculata*.

**U. fulva** (fervous). Slippery or Red Elm. *fl.* nearly sessile; perianth segments and stamens seven to nine. *fr.* orbicular, eight to nine lines wide, not ciliated, the cell pubescent. *l.* ovate-oblong, acuminate, doubly serrated, 4 in. to 8 in. long,

FIG. 140. LEAFY AND FLOWER-BEARING TWIGS OF *ULMUS GLABRA*.

**Ulmus**—continued.

very rough above, softly downy beneath, and slightly rough downwards, sweet-scented in drying. Branchlets downy; buds before expansion, softly downy with rusty hairs. North America. A small or medium-sized tree, with tough, reddish wood, and a very mucilaginous inner bark. (B. M. Pl. 233; T. S. M. p. 334.)

**U. glabra** (smooth). Wych Elm. *fl.* nearly sessile, five-cleft. *fr.*, samaras obovate, naked, deeply cloven, smaller than those of most other kinds. *l.* elliptic-oblong, doubly serrated, smooth, very unequal at base, not elongated at the extremity. *h.* 60ft. to 80ft. Europe (Britain). See Fig. 140. (Sy. En. B. 1286, under name of *U. suberosa glabra*.) Hooker regards this as merely a form of *U. campestris*.

**U. g. glandulosa** (glandular). *l.* very glandular beneath.

**U. g. latifolia** (broad-leaved). *l.* oblong, acute, very broad.

**U. g. major** (greater). Canterbury Seedling. Of more vigorous growth than the type.

**U. g. microphylla** (small-leaved). *l.* small.

**U. g. pendula** (pendulous). Downton Elm. A "weeping" variety.

**U. g. variegata** (variegated). *l.* variegated.

**U. g. vegeta** (vigorous)\*. Chichester or Huntingdon Elm. The most vigorous kind of Elm propagated in British nurseries, often making shoots from 6ft. to 10ft. in length in one season. The tree attains a height of 30ft. in ten years from the graft.

**U. major** (greater). A form of *U. montana*.

**U. montana** (mountain-loving)\*. Scotch or Wych Elm. *fl.* shortly pedicellate, five to seven-parted. *fr.*, samaras oblong or nearly round, glabrous, slightly cloven. *l.* 3in. to 6in. long, often 3in. in diameter, doubly and treble serrated, cuspidate, unequally rounded or cordate at base, rough above, pubescent or nearly glabrous beneath. Branches long, spreading. *h.* 80ft. to 120ft. Europe (Britain), Siberia. (Sy. En. B. 1287.) Most of the following varieties are distinct and handsome trees, and are well worth cultivating, either for use or for ornament:

**U. m. cebennensis** (Cevennes). A variety of spreading habit, but of much less vigorous growth than the normal form.

**U. m. crispa** (curled). *l.* crisped, thickly plicate-rugose, irregularly incised-pinnatifid. Habit slender and stunted. SYN. *U. urticæfolia*.

**U. m. fastigiata** (pyramidal). Exeter or Ford's Elm. *l.* peculiarly twisted, very harsh, feather-nerved, enfolding one side of the shoots, retaining their deep green until they fall off. A very remarkable, pyramidal form.

**U. m. major** (greater). *l.* falling almost a month sooner than those of *U. m. minor*. This tree is of upright and rapid growth, with few branches; in some stages, it approaches the habit of the type, but is of a more tapering form.

**U. m. minor** (lesser). Compared with *U. m. major*, this is of a more branching and spreading habit, of lower growth, with more twiggy shoots, which are more densely clothed with leaves.

**U. m. nigra** (black). Black Irish Elm. A spreading tree, with the habit of the normal form, but with more spreading leaves.

**U. m. pendula** (pendulous). "A beautiful and highly characteristic tree, generally growing to one side, spreading its branches in a fan-like manner, and stretching them out sometimes horizontally, and at other times almost perpendicularly downwards, so that the head of the tree exhibits great variety of shape." (London.)

**U. m. rugosa** (wrinkled). Bark reddish-brown, cracking into short, regular pieces, very like that of *Acer campestre*.

**U. parvifolia** (small-leaved). *fl.* shortly pedicellate; perianth four or five-cleft. *fr.* small, ciliated. *l.* small, narrow-lanceolate, oblique at base, slightly acute or scarcely acuminate at apex, simply serrated; adults coriaceous, highly glabrous, or the middle nerve and under side sparsely puberulous. Branches twiggy, often arcuate-deflexed. China and Japan. A medium-sized or diminutive shrub, according to the soil in which it grows.

**U. pedunculata** (pedunculate). *fl.*, perianth oblique; stamens six to nine, often eight, shortly exserted; pedicels slender, elongated, jointed; inflorescence pendulous. *fr.* glabrous, except the densely-ciliated margin. *l.* ovate or obovate, acuminate, deeply and doubly serrated, slenderly membranous, softly pubescent beneath. *h.* 50ft. to 60ft. Europe, 1800. SYN. *U. effusa*.

**U. Roseae** (Roseels). A synonym of *U. campestris aurea*.

**U. suberosa** (slightly erose). Cork-barked Elm. *fl.* stalked, four or five-cleft. *fr.*, samaras almost orbicular, deeply cloven, glabrous. *l.* pointed, rough, doubly and sharply serrated. Branches spreading, their bark corky. *h.* 60ft. to 100ft. Europe (Britain). According to Hooker, this is merely a form of *U. campestris*. (Sy. En. B. 1285.)

**U. s. erecta** (erect). This tree has a tall, narrow head, resembling that of the Cornish Elm (*U. campestris cornubiensis*); but it differs from that variety in having much broader leaves and a corky bark.

**U. s. foliis-variegatis** (variegated-leaved). This is only distinguished from the type by its variegated leaves.

**U. urticæfolia** (Nettle-leaved). A synonym of *U. montana crispa*.

**ULNA.** The average length of a man's arm—about 2ft.

**ULOSTOMA.** A synonym of *Gentiana* (which see).

**ULUXIA.** A synonym of *Columellia* (which see).

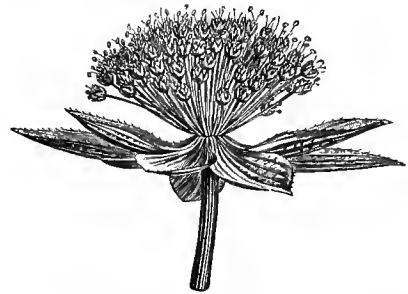


FIG. 141. SIMPLE UMBEL OF *ASTRANTIA HELLEBORIFOLIA*.

**UMBEL.** An inflorescence in which the flowers expand centripetally, and their stalks radiate from a common centre. A simple Umbel is shown in Fig. 141.

**UMBELLATE.** Disposed in or resembling umbels.

**UMBELLET, UMBELLULA.** A secondary or partial umbel; an umbel formed at the end of one of the rays of a general umbel.

**UMBELLIFERÆ.** A large natural order of herbaceous or rarely woody plants, principally inhabiting the Northern hemisphere. Flowers hermaphrodite or often polygamo-monoecious, rarely dioecious, umbellate or rarely capitate or whorled; calyx five-lobed, or almost wanting; petals five, valvate or sub-imbricate in bud, inserted outside an epigynous disk, free, caducous, the points generally inflexed, sometimes two-cleft or two-parted, the outer often largest; stamens five, alternate with, and inserted like, the petals; filaments inflexed in bud; anthers two-celled, introrse; umbels simple, or often duplicate-compound, terminal, solitary or many in a panicle. Fruit dry, two-celled, dividing into two mericarps, the surface marked with ten more or less prominent ridges. Leaves usually alternate, entire or variously toothed, cut, lobed, or pinnate; petioles usually dilated at base. Stem usually furrowed or channelled, knotty, fistular or full of pith. Among the useful Umbellifers, the following (indigenous to Britain) may be noted: Carrot (*Daucus Carota*), Chervil (*Anthriscus Cerefolium*), Parsley (*Carum Petroselinum*), and Parsnip (*Peucedanum sativum*). The order embraces upwards of 150 genera and about 1300 species, few of which are remarkable for horticultural beauty. Illustrative genera are: *Apium*, *Daucus*, *Myrrhis*, *Nartherx*, *Peucedanum*, *Sium*, *Smyrniurn*.

**UMBELLIFEROUS.** Umbel-bearing.

**UMBELLULARIA** (a diminutive from *umbella*, a sunshade, an umbel; in allusion to the form of inflorescence). SYNS. *Drimophyllum*, *Oreodaphne*. ORD. *Lawrinæe*. A monotypic genus. The species is a half-hardy, tall, evergreen tree or (on mountains) shrub, emitting a strong odour of camphor. For culture, see *Laurus*.

**U. californica** (Californian). Californian Sassafras. *fl.* greenish-yellow, shortly pedicellate, in solitary, cano-pubescent or glabrous umbels; perianth tube very short, the limb of six segments; involucre pedunculate, solitary in the upper axils, or clustered at the tips of the branches, very caducous. June. *l.* alternate, highly odoriferous, lanceolate-oblong, slightly narrowed at both ends, 2in. to 4½in. long, pinniveined and singularly reticulated. Branchlets twiggy, slender, mostly glabrous. *h.* sometimes as much as 100ft. California, 1862. SYNS. *Ocotea californica*, *Oreodaphne californica* (B. M. 5320).

**UMBER MOTHS.** Under this name are included two species of Geometer Moths, belonging to the genus *Hybernia* (which see), viz., *H. defoliaria*, or the Mottled

**Umber Moths—continued.**

Umber (see Fig. 142), and *H. aurantiaria*, or the Scarce Umber. The latter species, despite its popular name, is by no means rare, while the former is abundant; though neither species is often seen, owing to the perfect insects appearing towards the end of autumn, and being nocturnal in their habits. The females have only stumps of wings, and, being totally unable to fly, they have to crawl up the tree trunks to lay their eggs on the buds. The males have large, conspicuous wings, and fly in search of the females. The two species of Umber Moths are nearly alike in size and form, but differ in colours and markings.

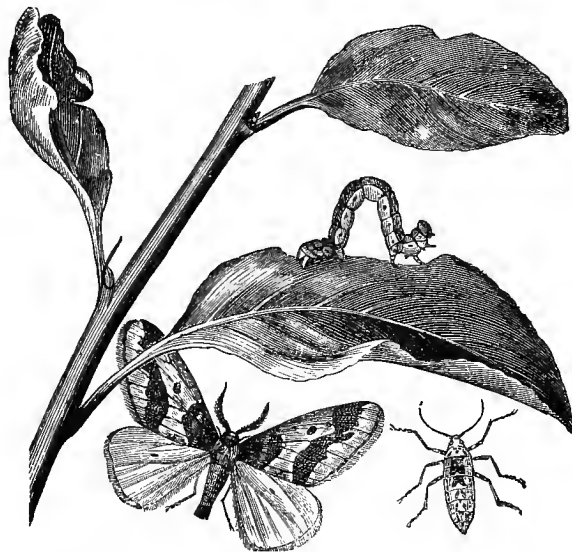


FIG. 142. MOTTLED UMBER MOTH (*HYBERNIA DEFOLIARIA*), showing Male, Female, and Larva.

The Mottled Umber has the body brown, with two rows of dark spots on the back of the abdomen. The fore wings of the male are usually pale brown, with two dark brown, rather irregular cross-bands, and a dark central spot, and the hind wings are paler, with a brown central spot. In some males, the wings are reddish-brown, closely sprinkled with darker dots, and other variations are not rare. The larva feeds on almost all kinds of trees. It is cylindrical, and rather slender, with six true legs in front, and four prolegs or claspers behind. The back is brown, bordered on each side by a narrow, wavy, black band, and crossed by grey markings. The sides are bright yellow; but the spiracles are white, and are surrounded by brown spots.

The Scarce Umber Moth has the body orange-brown, with darker spots, as in the other species. The fore wings of the male are dull orange, with three darker narrow cross-bars, two near the base, and the other beyond the middle. Beyond the latter, near the margin, is a row of brownish spots. The hind wings are paler, and all the wings have a dark central dot. The larva feeds on White-thorn, and occasionally on Oak and Birch. It is at first deep yellow, but when full fed it is dark dusky-green, with a pale brown stripe down the middle of the back.

The pupæ of both species are protected in slight cocoons on the surface of the ground.

**Remedies.** The females are unable to fly on to the trees; and they may be prevented from crawling up if a ring of tar and cart-grease, mixed in equal parts, is painted on the trunk near the ground, or on a belt of cloth or paper, or on a straw rope, fastened around the tree. The larvæ

**Umber Moths—continued.**

may be shaken off by jarring the branches, and should be collected on sheets of cloth or paper and destroyed. All surface rubbish that could shelter the pupæ should be cleared off.

**UMBILICATE.** Navel-like; depressed in the centre.

**UMBILICUS.** Included under *Cotyledon* (which see).

**UMBONATE.** Round, with a projecting point in the centre, like the boss or *umbo* of an ancient shield; e.g., the pileus of many *Agarica*.

**UMBRACULIFORM.** Umbrella-shaped.

**UMBRELLA LEAF.** See *Diphyllia cymosa*.

**UMBRELLA PINE, or PARASOL FIR.** See *Sciadopitys verticillata*.

**UMBRELLA PLANT.** See *Saxifraga peltata*.

**UMBRELLA TREE.** See *Magnolia Umbrella* and *Thespesia populnea*.

**UMBRELLAWORT.** See *Oxybaphus*.

**UNANUEA.** A synonym of *Stemodia* (which see).

**UNARMED.** Destitute of prickles, spines, or other hard projections; pointless.

**UNCARIA** (from *uncus*, a hook; the old petioles are converted into hooked spines). **SYNS.** *Agylophora*, *Ourouparia*. **ORD.** *Rubiaceæ*. A genus comprising about thirty species of stove, climbing shrubs, all tropical Asiatic, except one African and one American. Flowers yellowish, in globose, axillary, pedunculate, solitary or paniculate heads; calyx tube spindle-shaped, the limb five-lobed or parted; corolla tube long, funnel-shaped, the limb of five valvate lobes; stamens five, on the glabrous throat of the corolla; peduncles often headless, converted into hooked tendrils. Leaves opposite, shortly petiolate; stipules entire or bifid. *U. Gambier*, the only species calling for description here, thrives in a compost of loam, sand, and peat. Propagation may be effected by cuttings, inserted in sand, under a glass, in heat.

*U. Gambier* (Gambier). Gambier Catechu. *A.* pedicellate; calyx tomentose; corolla 4in. long; peduncles all axillary, bracteate in the middle, rarely more than 1in. long. May. l. ovate or ovate-lanceolate, obtusely sub-caudate or acuminate, 4in. to 5in. long, coriaceous, glabrous. *A.* 10ft. India, 1825. The gambier of commerce is obtained from this species. (*B. M. Pl.* 139.)

**UNCARIA** (of Burchell). A synonym of *Harpagophytum* (which see).

**UNCATE, UNCIFORM, UNCINATE.** Bent or curved at the tip like a hook.

**UNCIFERA** (from *uncus*, a hook, and *fero*, to bear; alluding to the curved process to which the pollen masses are attached). **ORD.** *Orchidææ*. A small genus (three species) of stove, epiphytal Orchids, natives of Khasya. Flowers rather small or mediocre, very shortly pedicellate, in lateral, dense, spike-like racemes; sepals sub-equal, free; petals similar or rather smaller; lip affixed to the base of the column, the base produced in a rather long, curved spur; lateral lobes small, the middle one entire or slightly three-lobed; pollen masses two. Leaves distichous; sheaths persistent, clothing the stem. *U. heteroglossa*, the only species introduced, is mainly of botanical interest. It thrives on a block or in a basket.

**Uncifera**—continued.

**U. heteroglossa** (variable-lipped). *fl.* white (?); sepals and petals oblong, blunt; lip hollowed out, the front border thickened; spur ascending, hooked; raceme rather short, pale, closely speckled with red. 1878.

**UNCINATE.** See **Uncate**.

**UNDER-SHRUB.** A small, woody plant, the ends of its branches perishing annually.

**UNEDO.** A synonym of **Arbutus** (which see).

**UNEQUALLY PINNATE.** Pinnate, with an odd, terminal leaflet.

**UNGNADIA** (named after Baron von Ungnad, the introducer of the Horse Chestnut). *ORD. Sapindaceæ.* A monotypic genus. The species is a half-hardy shrub or small tree, allied to *Pavia*. It is best grown in the open air in summer, and removed to a cool conservatory for winter. It will thrive in almost any soil, and may be propagated by layering, or by imported seeds.

**U. speciosa** (showy). *fl.* pink, polygamous, in lateral, aggregated corymbs or fascicles; calyx sub-equal, four or five-partite; petals four or five, sub-equal, the claws connate-crested at apex; stamens seven to ten. June. *l.* alternate, exstipulate, impari-pinnate; leaflets six or seven pairs, 4in. long, very shortly petiolulate, ovate-lanceolate, obtuse and acuminate, the terminal one long-petiolulate. Texas, 1850. (F. d. S. 1059.)

**UNGUACHA.** A synonym of **Strychnos** (which see).

**UNGUICULATE.** A term applied to petals which have an *unguis* or stalk.

**UNI.** This term, used in Latin compounds, signifies one: e.g., Uniflorous, one-flowered; Unijugate, of one pair; Unilateral, one-sided; Unisexual, of one sex, having stamens only or pistils only.

**UNICORN BEETLE** (*Copris lunaris*). This can scarcely be included among Garden Insects, strictly so called; yet a brief notice of it will not be out of place, as it may at times be found in gardens in the South-east of England, especially around London, and is sure to attract notice on account of the curious horn on the head. The



FIG. 143. MALE UNICORN BEETLE (*COPRIS LUNARIS*), about twice the natural size.

general form is shown in Fig. 143, which is, however, about twice the natural size. The colour is glossy black, with a fringe of chestnut hairs round the edge of the body. The head and thorax of the males bear outgrowths or horns, as shown in the figure. The wing-cases are grooved lengthwise. The horns of the females are much less conspicuous. These Beetles are beneficial, rather than otherwise, in gardens, inasmuch as the females make burrows in the soil, and carry dung into them for the nourishment of the larvæ, which are hatched from eggs deposited among it.

**UNICORN PLANT.** A common name for *Martynia lutea* and *M. proboscidea*.

**UNINTERRUPTED.** Consisting of regularly increasing or diminishing parts, or of parts of the same size.

**UNIOLA** (from *unus*, one; so-called by Linnæus owing to the union of the glumes). Spike Grass. *SYNS. Chasmanthium, Trisiola.* *ORD. Gramineæ.* A small genus (four species) of hardy and half-hardy, perennial Grasses, natives of North America. Spikelets closely many-flowered, very flat and two-angled; glumes lanceolate, compressed-keeled; stamens three; panicles sometimes elongated, sometimes ample, loose or dense. Leaves flat or convolute. Perhaps the most ornamental species are described below. Seeds should be sown, in early spring, in the open border.

**U. latifolia** (broad-leaved). *fl.* acute, ciliated on the keel, all but the lowest perfect and monandrous; spikelets at length oblong, 1½ in. to 2 in. long, hanging on long pedicels; panicle loose. August. *l.* nearly 1in. broad, flat. Culm 2ft. to 4ft. high. (B. H. vii. p. 192.)

**U. paniculata** (prominent-panicled). *fl.* glabrous, bluish, several of the lower ones sterile, the fertile ones with three stamens; spikelets ovate, 1½ in. to 2 in. long, on short pedicels; panicle open, elongated. *l.* narrow, convolute when dry. Culm elongated. *h.* 4ft. to 8ft.

**UNISEMA.** A synonym of **Pontederia** (which see).

**UNONA** (probably a variation from *Anona*, an allied genus). *ORD. Anonaceæ.* A genus embracing eighteen species of stove trees or climbing shrubs; four or five are found in Africa and the rest in tropical Asia. Flowers mostly solitary, axillary or extra-axillary, rather large; sepals three, valvate; petals six, valvate or open in aestivation, biseriata; stamens numerous, tetragonal-cuneate. Leaves alternate, entire, exstipulate. Several species have been introduced, but are probably lost to cultivation.

**UPAS-TREE.** See **Antiaris toxicaria**.

**UPLAND WILLOW OAK.** See **Quercus cinerea**.

**UPRIGHT PORTUGAL LAUREL.** A common name for *Cerasus lusitanica myrtifolia* (which see).

**URALEPIS.** A synonym of **Triodia** (which see).

**URALEPSIS.** See **Triodia**.

**URANANTHUS.** A synonym of **Eustoma** (which see).

**URANIA.** A synonym of **Ravenala** (which see).

**URARIA** (from *oura*, a tail; alluding to the bracts). *SYN. Doodia* (of Roxburgh). *ORD. Leguminosæ.* A genus embracing eight species of stove, suffruticose perennials, inhabiting tropical Asia, Africa, and Australia. Flowers very numerous, minute, racemose; calyx tube very short, the two upper teeth short, the three lower ones usually elongated; standard broad; wings adhering to the obtuse keel; stamens diadelphous. Leaves stipellate; leaflets one to nine. Several species have been introduced; but it is doubtful whether any are in cultivation. Those described below thrive in a compost of sand, loam, and peat. Propagation may be effected by cuttings, inserted in sand, under a glass, in heat.

**U. crinita** (hairy). *fl.* purplish, 1½ in. long; racemes dense, above 1ft. long. July. *l.* upper ones three to seven-foliolate; leaflets oblong, sub-coriaceous, green and smooth above, paler and reticulate-veined beneath, 4in. to 6in. long, 1½ in. to 2 in. broad, rounded at base. *h.* 3ft. to 6ft. India.

**U. picta** (painted). *fl.* purple; corolla slightly exserted; racemes dense, cylindrical, 6in. to 12in. long. July. *l.* leaflets four to six, rarely nine, linear, rigidly sub-coriaceous, glabrous above, minutely pubescent beneath. Stems robust, finely downy. *h.* 3ft. to 6ft. Himalayas, Philippines, &c., 1788.

**URCEOLARIA** (of Cothenius). A synonym of **Schradera** (which see).

**URCEOLARIA** (of Herbert). A synonym of **Urceolina** (which see).

**URCEOLATE.** Hollow and contracted at or below the mouth, like a pitcher.

**URCEOLINA** (from *urceolus*, a small cup or pitcher; alluding to the shape of the perianth). *SYNS.* *Collania*, *Urceolaria* (of Herbert). Including *Leperiza* (in part), *Pentlandia*, and *Sphaerotele* (of Link). *ORD.* *Amaryllidaceæ*. A small genus (three species) of greenhouse, bulbous plants, inhabiting the Andes of South America. Flowers many in an umbel, rather long-pedicellate; perianth erect, at length recurved or pendulous, contracted above the ovary, and then enlarged into an oblong-tubular or urceolate throat or limb, the lobes sub-equal, connivent or connate, shortly spreading at apex; stamens equally affixed to the throat, often exceeding the perianth; filaments straight; involucre bracts two, scarious; scape solid. Leaves flat, ovate, oblong, or narrow, contracted into the petioles. For culture, see *Amaryllis*.

**U. aurea** (golden). A garden synonym of *U. pendula*.

**U. latifolia** (broad-leaved). *fl.*, perianth segments yellowish-red, greenish at apex, ovate, minutely acuminate, concave, equal; scape erect, 1 ft. or more high, solitary, terete. April. *l.* petiole, oblong, acute, 1 ft. long, 2 in. to 3 in. broad, striated above, shining, nerved beneath, glabrous. *SYN.* *Leperiza latifolia* (B. M. 4952).

**U. miniata** (scarlet). *fl.* nodding; perianth cinnabar-red or scarlet, 1½ in. long, glabrous, the segments broadly ovate, acute; scape erect, slightly twisted above, 8 in. to 14 in. long. September. *l.* one or two, lanceolate, acute, narrowed and sub-petiolate, 6 in. to 8 in. long, striated above, the margins reflexed. Bulb as large as a walnut. 1836. *SYN.* *Pentlandia latifolia* (B. R. 1839, 68).

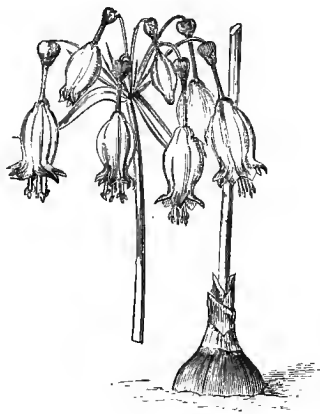


FIG. 144. URCEOLINA PENDULA.

**U. pendula** (pendulous). Drooping Urn Flower. *fl.* pendent; perianth yellow in the basal half, green above, margined with white, 2 in. long; segments lanceolate, concave, the three outer ones longer. June. *l.* solitary or twin, long-petiolate, erect, many-nerved, glabrous; petioles terete, compressed above. See Fig. 144 (for which we are indebted to Messrs. Veitch and Sons). (B. M. 5464.) *SYNS.* *U. aurea* (of gardens), *Collania urceolata*.

**URECHITES** (from *oura*, a tail, and *Echites*, an allied genus; in allusion to the twisted appendages of the corolla). *ORD.* *Apocynaceæ*. A small genus (four species ?) of prostrate or twining, glabrous or puberulous, stove undershrubs, natives of the West Indies and Mexico. Flowers usually ample; calyx five-parted, glandular inside at base; corolla funnel-shaped, with a short, cylindrical tube, a long tubular-campanulate throat, and five broad, twisted lobes; stamens affixed at the top of the tube; racemes simple, often few-flowered, or reduced to two flowers. Leaves opposite, pinnate. Only one species calls for mention here. For culture, see *Dipladenia*.

**U. sub-erecta** (nearly erect). *fl.* full-yellow, large, on short pedicels; peduncle terminal, hairy, bearing a loose, four to six-flowered cyme. May. *l.* shortly petiolate, ovate or oval, nearly

### Urechites—continued.

elliptical, but rather acute at each end; young ones (and branches) loosely silky. Stem shrubby in the older portions. New Grenada, 1845. *SYNS.* *Dipladenia flava* (B. M. 4702), *Echites sub-erecta* (B. M. 1064).

**URENA** (from *Uren*, the Malabar name). Indian Mallow. *ORD.* *Malvaceæ*. A small genus (four or five species) of stove herbs or under-shrubs, inhabiting the tropical regions of both hemispheres. Flowers small, sessile or shortly pedunculate, usually clustered; bracteoles five, adnate to the five-cleft or five-toothed calyx; petals five; staminal tube truncate or minutely toothed. Leaves often angular or lobed. The species are mostly uninteresting. *U. lobata*, the only one calling for mention, thrives in any light, rich soil. Propagation may be effected by seeds.

**U. lobata** (lobed-leaved). *fl.* pink; bracteoles oblong-lanceolate, equalling the calyx. Summer. *l.* cordate, five to seven-lobed, the lobes acute or obtuse; petioles usually shorter than the blades. India. A very variable, more or less hairy, annual herb. (B. M. 3943.)

**URGINEA** (from the name of an Arab tribe, Ben Urgin, in Algeria). Including *Squilla*. *ORD.* *Liliacæ*. A genus comprising about two dozen species of stove, greenhouse, or hardy, bulbous plants, natives of Europe, the Mediterranean region, the East Indies, and tropical and South Africa. Flowers usually numerous, in a terminal raceme, rather small or mediocre, on articulated pedicels; perianth whitish or rarely pale yellowish or pink, at length deciduous; segments six, distinct, nearly equal, campanulate-connivent or spreading; stamens six; scape simple, leafless; bracts small, scarious. Leaves radical, sometimes very narrow-linear, sometimes broadly loriform or nearly oblong. The bulbs of *U. maritima* are well-known in medicine as Squills. The species best known in gardens are here described. With the exception of *U. maritima*, all are natives of South Africa, and require greenhouse heat. For culture, see *Scilla*.

**U. altissima** (very tall). *fl.*, perianth nearly campanulate, three to four lines long, the segments whitish, with a purplish-green keel, ligulate; pedicels slightly spreading or ascending, the lower ones six to nine lines long; raceme cylindrical, dense, 1 ft. to 2 ft. long, 1½ in. to 2 in. broad; scape 2 ft. to 3 ft. long, ½ in. or more thick. May. *l.* five or six, lorate-lanceolate, glabrous, 1 ft. to 1½ ft. long, 1½ in. to 2 in. broad at base, acute at apex. Bulb globose, 4 in. to 6 in. thick. 1789. *SYN.* *Drimys altissima* (B. M. 1074).

**U. exuviata** (stripped). *fl.*, perianth five to six lines long, the segments whitish, purple-keeled; pedicels ascending, the lower ones four to six lines long; raceme rather dense, ten to twenty-flowered, 2 in. to 4 in. long. June. *l.* two to four, hard, semi-terete, glabrous, flexuous, 1 in. to 1½ in. long, half to three-quarters of a line broad. Bulb globose, 1 in. to 1½ in. thick, the outer scales long-produced, transversely striped. 1795. "Jacquin applied the specific name of *exuviata* from some resemblance in the membranous tunics of the bulb to the sloughs annually cast by snakes." *SYN.* *Albuca exuviata* (B. M. 871).

**U. filifolia** (thread-leaved). *fl.*, perianth three to four lines long, the segments whitish, purple-keeled, oblong; pedicels three to six lines long; raceme rather dense, six to twenty-flowered; scape erect, slender, 6 in. to 15 in. long. June. *l.* three to six, filiform, hard, glabrous, flexuous, 8 in. to 12 in. long, a quarter to half a line thick. Bulb globose, 1½ in. thick, fuscous-tunicated. 1820. *SYN.* *Albuca filifolia* (B. R. 567).

**U. fragrans** (fragrant). *fl.* odorous; perianth five to six lines long, the segments whitish, purple-keeled, oblong; pedicels four to six lines long; raceme rather loose, twelve to twenty-flowered, 4 in. to 6 in. long; scape slender, terete, glaucous, 1 ft. long. July. *l.* twelve to twenty, semi-terete, glabrous, persistent, 6 in. to 8 in. long, half a line broad. Bulb globose, 1½ in. to 2 in. thick. 1791. *SYN.* *Albuca fugax* (B. R. 311).

**U. maritima** (sea-loving).\* Sea Onion; Squills. *fl.*, perianth three to four lines long, the segments whitish, with a greenish-purple keel; pedicels six to nine lines long; raceme dense, 1 ft. or more long; scape 1 ft. to 3 ft. long, terete, reddish. Autumn. *l.* appearing in spring, ten to twenty, lanceolate, fleshy-herbaceous, glaucous-green, glabrous, 1 ft. to 1½ ft. long, 2 in. to 4 in. broad above the middle. Bulb ovoid, 4 in. to 6 in. thick. Mediterranean region, 1829. Half-hardy. *SYNS.* *U. Scilla* (B. M. Pl. 281), *Ornithogalum Squilla* (B. M. 918).

**U. physodes** (bladder-like). *fl.*, perianth ½ in. long, the segments whitish, purple-keeled; pedicels eight to ten lines long; raceme rather dense, thirty to sixty-flowered, 3 in. to 5 in. long, cylindrical;



**Urginea**—continued.

scape slender, 6in. long. June. *l.* five or six, lanceolate, fleshy-herbaceous, glabrous, 6in. to 9in. long, 1in. to 1½in. broad. Bulb purplish, 1½in. to 1¾in. thick. 1804. *SYN. Albuca physodes* (B. M. 1046).

**U. Scilla** (Scilla). A synonym of *U. maritima*.

**URINE.** An excellent manure, because of the substances contained in it. Of these, one of the most important is Ammonia, either uncombined, or united with various acids to form compounds. From these substances plants are able to obtain the Nitrogen required for the production of protoplasm. There are also various mineral compounds in solution in Urine, in a form available for plants; in fact, the Urine of most animals is of more value as a manure than their solid excrement. Analysis of various Urines gives the following results: Urine of cattle contains 8 per cent. of solid matters; of horses, 11 per cent.; of sheep, 13 per cent.; of pigs, 25 per cent.; and of man, from 3 to 6 per cent. Amongst the substances in Urine are Carbonates, Phosphates, Chlorides, and Sulphates of Ammonia, and of other alkalis, along with a good deal of Urea and of Uric Acid. The two last substances readily undergo chemical changes into Ammonia and its compounds. The addition to the Urine of Gypsum, or of coarse Sulphuric Acid, forms Sulphate of Ammonia, and thus prevents the loss of the Ammonia by evaporation into the atmosphere. Urine should be permitted to become stale or to putrefy before being applied to the soil. It is a very valuable manure for almost all kinds of garden produce and fruit-trees; and, when diluted with three or four times its bulk of water, may be employed in the fluid state. It may also be mixed up as a compost with soil and vegetable refuse. The mass should be allowed to ferment for some time, and may then be applied like ordinary farm-yard manure. Owing to its very strong and unpleasant smell when stale, Urine should not be freely used close to houses. Instead of being allowed to run to waste, as it so often is, arrangements should be made for collecting the farm-yard Urine into a tank, and for storing it up for use as described above.

**URN FLOWER, DROOPING.** See *Urceolina pendula*.

**UROCYSTIS** (from *oura*, a tail or stalk, and *kystis*, a vessel or bladder; in allusion to the stalked, vesicular spores). This is one of the genera included in the group of Fungi known to botanists as the *Ustilaginei*, and in popular language as Smuts, from their loose, dark spores giving a dirty appearance to the plants in which they grow. The Fungi in this genus are parasites; they grow for a while inclosed in the tissues of living plants; then, when the spores ripen, they form dark swellings, whose growth bursts the outer tissues of the host-plant, and discloses the powdery mass of spores. The parts in which these are formed are usually much swollen and distorted. The spores of *Urocystis* vary a good deal in size and form, but usually consist of a layer of rather small cells, surrounding a larger central cell, which is the one actively concerned in the development of new mycelium when the spore is kept in a warm, moist atmosphere. The spores are fixed on the tips of branches till ripe, when they fall from the stalks. The species of *Urocystis* are hurtful to cultivated plants, and the following occur in Britain: *U. Viola* grows in petioles and other organs of the Sweet Violet (*Viola odorata*); *U. Anemones* is very common on various kinds of *Anemone*, and on allied plants; and *U. sorosporioides* occurs on leaves and flowers of *Thalictrum*.

For remedies, see **Ustilago**.

**UROPEDIUM.** Included under **Selenipedium** (which see).

**UROPETALUM.** A synonym of **Dipcadi** (which see).

**UROSKINNERA** (named after G. Ure Skinner, a merchant and collector of Central American plants). *ORD. Scrophularineæ.* A genus consisting of a couple of species of softly villous, stove herbs, natives of Central America and Mexico. Flowers rosy-violet, rather large, declinate, shortly pedicellate, with two bristly bracts at base; calyx tubular-campanulate, with four or five short, bristly teeth; corolla tube elongated, enlarged above, the limb of five scarcely unequal, spreading lobes; stamens four, included; style elongated, very shortly bifid; spike or raceme terminal, dense, secund. Leaves opposite, petiolate, soft, crenate. *S. spectabilis*, the only species introduced, thrives in sandy loam. It may be increased by cuttings, inserted in sand, under a bell glass, in heat.

**U. spectabilis** (showy). *fl.* in sessile, terminal, very close spikes about 3in. long; calyx small, hairy, four-toothed; corolla smooth, 1½in. long, funnel-shaped. July. *l.* oblong, toothed, 2in. to 4in. long. *h.* 1ft. to 1½ft. Mexico, 1856. Plant grey with close hairs. (B. M. 5009; F. d. S. 1433.)

**UROSPATHA** (from *oura*, a tail, and *spatha*, a spathe; referring to the long-pointed spathe in most of the species). *ORD. Aroidæ (Araceæ).* A genus comprising about ten species of stove, marsh-loving herbs, with thick rhizomes, natives of tropical America. Flowers hermaphrodite, the lower ones sterile; spathe erect, closed at base, at length opening, long-narrowed above, straight, decurved, or twisted, persistent; spadix sessile or nearly so, inappendiculate, much shorter than the spathe; perianth segments and stamens four to six; peduncle elongated. Leaves few, hastate-sagittate, with diverging nerves or nearly parallel ribs; petioles elongated, sheathing at base. The two introduced species thrive in light, loamy soil, and require an abundance of water when growing. They may be propagated by division of the rootstock.

**U. desciscens** (degenerate). *fl.*, spathe brown and claret-coloured, convolute below, gaping above, long-acuminate, incurved or arcuate; spadix sessile, cylindroid, obtuse, shorter than the spathe tube; peduncle equalling the petioles. *l.* broadly lobed, the anterior one triangular, acuminate, the posterior rather longer, oblong, acuminate, very inequilateral; petioles smooth, nearly twice the length of the blades. *h.* 3ft. Brazil, 1860.

**U. sagittifolia** (sagittate-leaved). *fl.*, spathe yellowish-green or deep green, mottled or blotched with grey or rosy-red, lanceolate, long-acuminate; spadix green, cylindrical, a quarter to one-fifth the length of the spathe. *l.* broadly lobed, hastate-sagittate, the anterior lobe lanceolate-triangular, acuminate; basal lobes rather longer, oblong-lanceolate; petioles slightly scabrous or scabrid, warted. Para, 1866. "*U. elegans*, *U. grandis*, *U. picturata*, *U. spectabilis*, and *U. splendens*, all from Para, are garden names for what are probably varieties of this species" (N. E. Brown).

**UROSPERMUM** (from *ouros*, a tail, and *spermum*, a seed; alluding to the beaked achenes). Sheep's Beard. *SYN. Arnopogon.* *ORD. Compositæ.* A small genus (two species) of hardy, annual or biennial, slightly-branched herbs, natives of the Mediterranean region. Flower-heads yellow, long-pedunculate at the tips of the branches; involucre campanulate, with seven or eight bracts in one series, spiny outside; receptacle conical, naked; ray florets ligulate, truncately five-toothed at apex; achenes beaked. Leaves radical or alternate, deeply toothed or lyrate-pinnatifid; cauline ones amplexicaul. Only one species calls for mention here. It is a biennial, of easy culture in common soil.

**U. Dalechampii** (Dalechamp's). *fl.*-heads on naked peduncles; involucre velvety-pubescent. June. *l.* variously runcinate, toothed. *h.* 1½ft. South Europe, 1739. *SYN. Arnopogon Dalechampii* (B. M. 1623; S. F. G. 780).

**URSINIA** (named after John Ursinus, of Regensburg, 1608-1666, who wrote an "Arboretum Biblicum"). Including *Sphenogyne*. *ORD. Compositæ.* A genus comprising fifty-four species of greenhouse or half-hardy, annual or perennial herbs or shrubs, natives of South Africa, one also extending to Abyssinia. Flower-heads solitary or loosely paniculate, heterogamous; involucre

**Ursinia**—continued.

hemispherical or broadly campanulate, with several series of imbricated bracts; receptacle paleaceous; ray florets wholly yellow or purplish outside; disk yellow; achenes glabrous or pubescent. Leaves alternate, serrated, pinnatifid, or often pinnately dissected. A selection of the best-known species is here given. They are very elegant plants, and succeed in a compost of loam and peat. *U. anthemoides* and *U. pulchra* may be increased by seeds. The rest are greenhouse shrubs, cuttings of which will root readily in sand, under a glass.

**U. abrotanifolia** (Southernwood-leaved). *fl.*-heads solitary on tomentose peduncles 6 in. to 10 in. long; ray florets wholly yellow. July. *l.* bi-tripinnatisect, 1½ in. to 2 in. long; segments narrow-linear, divergent, acute, the lowest short and nearly simple. Branches erect, curved, leafy, clothed with pale, woolly hairs. *h.* 1 ft. to 2 ft. 1789. *SYN. Sphenogyne abrotanifolia*.

**U. anthemoides** (Chamomile-like). *fl.*-heads on long, naked, drooping peduncles; ray florets purplish outside. August. *l.* either pinnatifid or sub-pinnatifid; lobes linear-filiform, acute or mucronate, the lower shorter or very small, the upper trifid or spinulose, spreading. *h.* 3 in. to 12 in. 1774. Half-hardy annual. *SYN. Arctotis anthemoides* (B. M. 544), *Sphenogyne anthemoides*.

**U. crithmifolia** (Sampshire-leaved).\* *fl.*-heads 1 in. to 1½ in. in diameter, on peduncles 3 in. to 10 in. long; ray florets wholly bright yellow. July. *l.* pinnatifid or trifid, 1½ in. to 2 in. long; lobes linear-filiform, semi-terete, acute, the lower ones short or obsolete, the rest elongated. *h.* 1 ft. to 2 ft. 1768. Erect and densely leafy. *SYN. Sphenogyne crithmifolia* (B. M. 3042).

**U. dentata** (toothed). *fl.*-heads rather small; ray florets coppery beneath; peduncles 6 in. to 9 in. long, one-headed. June. *l.* pinnatifid, ¼ in. to ¾ in. long; lobes short, entire or trifid, the teeth tipped with a bristle. Branches curved, closely leafy. *h.* 1 ft. to 2 ft. 1787. *SYN. Sphenogyne dentata*.

**U. pilifera** (bristle-bearing). *fl.*-heads on long, sub-hispid pedicels; ray florets purplish outside. December. *l.* pinnatisect, fleshy, spreading, shortly hispid; lobes linear, tipped with a bristle. 1821. Shrub diffuse. *SYN. Sphenogyne pilifera* (B. R. 604).

**U. pulchra** (pretty).\* *fl.*-heads bright orange; ray florets somewhat lanceolate, bitten at the extremities. June and July. *l.* twice pinnate, sessile; leaflets linear, acute, somewhat recurved. Stems roundish, slightly declinate at the base, ascending, branched, smooth. *h.* 1 ft. Native place unknown. 1836. Hardy annual. *SYN. Sphenogyne speciosa* (P. M. B. vi., p. 77).

**URTICA** (the old Latin name used by Horace and Pliny, from *uro*, to burn; referring to the stinging properties of most species). Nettle. ORD. *Urticaceæ*. A genus comprising about thirty species of greenhouse or hardy, annual or perennial herbs, rarely shrubby at base, armed with stinging hairs; they are broadly dispersed over temperate and sub-temperate regions. Flowers monœcious or diœcious; clusters cymulose, spicate, racemose, or paniculate; inflorescence unisexual or androgynous. Leaves opposite, petiolate, toothed or incised-lobed. The British Flora includes *U. dioica* (the young leaves of which are a good pot-herb), *U. pilulifera* (the most virulent native Nettle), and *U. urens*. The stinging effects of *U. urentissima* (Devil's Leaf), a native of Timor, are said to be so violent as to last for twelve months, and sometimes to cause death. Many species produce excellent fibre, and several are considered to possess medicinal properties. None are of any horticultural value.

**U. involucreta** (involucred). A synonym of *Pilea pubescens*.

**U. reticulata** (reticulated). A synonym of *Pilea reticulata*.

**URTICACEÆ**. A natural order of trees, shrubs, or herbs, broadly dispersed over the temperate and warmer regions of the globe. Flowers unisexual or rarely polygamous, regular or by reduction irregular; perianth simple, calycine; stamens of the male flowers as many as the perianth segments, very rarely fewer or rather more, the anthers ovate or oblong; staminodes of the females rare, the ovary superior, or in a few genera more or less inferior; primary inflorescence centripetal, axillary or at the nodes, never terminal; ultimate inflorescence normally centrifugal, cymulose; bracts often small or wanting; bracteoles minute or wanting, sometimes conspicuous. Fruit indehiscent, one-seeded. Leaves alter-

**Urticaceæ**—continued.

nate or rarely opposite, entire, toothed, lobed, or palmately parted, not pinnate, very rarely, pinnatifid. Among the more important members of this order the following may be enumerated: Breadfruit-tree (*Artocarpus incisa*), Elm (*Ulmus*), Fig (*Ficus Carica*), Hemp (*Cannabis sativa*), Hop (*Humulus Lupulus*), Indiarubber-plant (*Ficus elastica*), Mulberry (*Morus alba* and *M. nigra*). Several of the species are valuable timber trees. The order is divided into eight tribes: *Artocarpeæ*, *Cannabineæ*, *Celtideæ*, *Conocephaleæ*, *Moreæ*, *Thelygoneæ*, *Ulmææ*, and *Urticææ*. It embraces nearly 110 genera and 1500 species. Examples: *Artocarpus*, *Cannabis*, *Ficus*, *Humulus*, *Morus*, *Ulmus*, *Urtica*.

**URVILLEA** (named after Capt. Dumont D'Urville, of the French navy, an acute botanist, who was sent out to ascertain the fate of La Peyrouse). ORD. *Sapindaceæ*. A genus comprising about half a score species of climbing or twining, stove shrubs, inhabiting tropical America. Flowers whitish, in axillary racemes; peduncles bearing two tendrils at the apex. Leaves alternate, stipulate; leaflets entire or deeply toothed, sometimes pellucid-dotted. One or two species have been introduced, but they are unworthy of cultivation. *U. ferruginea* is now and then met with in botanic gardens, and is interesting on account of the peculiar structure of its triquetrous stems.

**USTERIA** (of Cavanilles). Included under **Maurandya** (which see).

**USTILAGINEI** (named from *Ustilago*, the largest genus in the group). This is the scientific name of the Fungi included under the popular name of **Smut**, under which name is given a short account of them, and of the characters by which the more important genera are distinguished from one another. The mycelium seems to enter, usually, into seedling plants, and to make its way among the cells of all parts; but while the reproductive organs (spores) of some species may be formed in masses in almost any part of the host-plant, those of certain others are produced only in the reproductive organs (stamens or ovaries), or in the leaves. Several examples are mentioned under **Smut**. See also **Ustilago**.

**USTILAGO** (from *ustus*, burnt; in allusion to the scorched appearance of the organs of the host-plants in which the spores are developed). A genus of Fungi, belonging to the group *Ustilaginei* (see **Smut**). It is distinguished from the other genera in the group by the spores, each being a single, isolated, roundish or angular cell, which germinates by a mycelium filament pushed out at one side. The spores are usually brown, dark purple, or nearly black, when in mass. *Ustilago* may be regarded as nearly typical of the *Ustilaginei*. About forty European species are known; many of these occur in the British Islands. A number of them live in the leaves or flowers of Grasses; e.g., *U. longissima* forms black streaks in leaves of *Glyceria fluitans* and other swamp-loving Grasses; *U. hypodytes* grows below the leaf-sheaths of several Grasses, including among others the ornamental species, *Stipa pennata* and *S. capillaris*; *U. segetum* (see Fig. 145) destroys the ovaries of Oats, Barley, and many other Grasses; *U. Caricis* (*U. ureolorum*) is very common on many of the species of *Carex*, infesting the ovaries, and reducing them to the state of balls of sooty-looking powder; *U. utriculosa* and some allied forms destroy the ovaries of various kinds of *Polygonum*; *U. violacea* (*U. antherarum*) is exceedingly common in the flowers of *Lychnis*, *Silene*, *Stellaria graminea*, and other Caryophyllaceous plants, filling the stamens with its reddish-violet spores, and thus destroying the flowers; *U. flosculorum* acts similarly in the flowers of *Scabiosa arvensis*, *S. Columbaria*, and *S. succisa*; *U. Tragopogi-pratensis* (*U. receptaculorum*) destroys all the florets in the heads of *Tragopogon pratensis* and *T. porri*.

**Ustilago**—continued.

*folius*, replacing them by a mass of sooty spores. In addition to the above, which are all British species, may be mentioned: *U. Ornithogali*, which, in Germany, forms swellings, about  $\frac{1}{4}$  in. long, in the leaves of species of *Ornithogalum* and *Gagea*; and *U. Tulipæ*, which forms similar swellings on Tulips. When the spores are ripe, the epiderm above the swellings bursts, and exposes the brown spores to view.

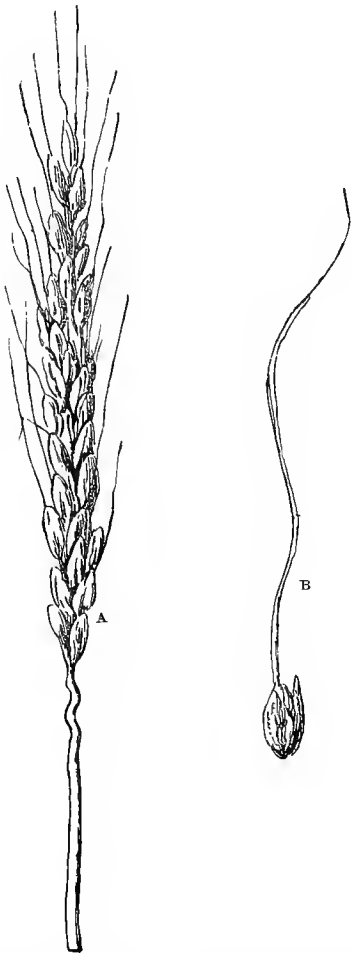


FIG. 145. *USTILAGO SEGETUM* ON BARLEY, showing (A) Diseased Inflorescence, natural size, and (B) Diseased Spikelet, enlarged.

**Treatment.** Plants attacked by these Fungi cannot be freed from them, as the mycelium is in the tissues; but frequently only some of the stems on a plant show their presence, and the other parts seem healthy. Such parts as do show the Fungi should be removed and burned, before the spores ripen, in order to prevent their dispersion. To check the ravages of *U. segetum*, the Smut of corn, the seed, before sowing, is sometimes sprinkled with stale urine, and then raked in quicklime till it becomes white; or it is steeped in a solution of one pound of sulphate of copper in five quarts of water, this quantity of solution being sufficient for four bushels of wheat. The object aimed at is to kill any spores of the Fungi adhering to the seeds, without destroying the vitality of the latter; and the above methods are found

**Ustilago**—continued.

to give good results. Perhaps they might prove successful with garden seeds also, and might be employed with advantage against *Urocystis* and the other genera of *Ustilagineæ*.

**UTANIA.** A synonym of *Fagraea* (which see).

**UTRICLE.** A small, bladdery pericarp; any thin, bottle-like body.

**UTRICULAR, UTRICULATE, UTRICULIFORM, UTRICULOSE.** Having, or consisting of, utricles; bladder-like.

**UTRICULARIA** (from *utriculus*, a little bottle; alluding to the minute, pitcher-like bodies developed on the leaves and roots). Bladderwort; Hooded Water Milfoil. ORD. *Lentibulariæ*. A large genus (nearly 150 species) of cosmopolitan, stove, greenhouse, or hardy, floating, epiphytall (e.g., *montana*), or terrestrial herbs. Calyx two-parted or deeply two-lobed; corolla spur often incurved; upper lip erect, entire, emarginate, or bifid; lower one often large and spreading, three to six-lobed; scape simple or slightly branched, one-flowered or bearing a many-flowered raceme. Leaves of the floating species many-partite, with capillary segments, furnished with minute pitchers, which entrap animalcules; those of the erect species entire. *U. intermedia*, *U. minor*, *U. neglecta*, and *U. vulgaris*, are worthy of being grown as curiosities. The first thrives in shallow pans of water in which sphagnum has been established, and the other three in deeper vessels; towards winter, all four form compact, round winter heads—at the ends of the branches—which fall to the bottom of the water and remain there until the following spring. *U. Endresii* and *U. montana* do best in baskets of fibry peat and sphagnum, suspended near the glass. *U. Humboldtii* and *U. reniformis* will grow in large pots of peat and sphagnum, partially plunged in water. *U. bifida* thrives in a pot of ordinary soil, placed a few inches below the surface of a warm tank.

***U. bifida* (bifid).\*** *fl.*, corolla bright yellow, with a very large and prominent, hemispheric, orange-yellow palate, the upper lip reflexed, the lower very short and two-lobed; scapes numerous, erect, two to five times as long as the leaves. September. *l.* erect,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, filiform or slightly thickened upwards, bright green. Hong Kong, 1882. Plant densely tufted. Greenhouse. (B. M. 6689.)

***U. Endresii* (Endres').\*** *fl.* drooping, on very slender pedicels; sepals pale greenish or reddish,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long; corolla pale lilac, with a yellow palate,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in diameter, beautifully ciliate all round; scape twice as long as the leaves, erect, about five-flowered. Spring. *l.* solitary,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, narrowly elliptic-lanceolate, narrowed into stiff petioles of the same length. Rhizomes slender, creeping, bearing ovoid tubercles  $\frac{1}{2}$  in. long. Costa Rica, 1874. Greenhouse. (B. M. 6656). SYN. *U. montana rosea* (of gardens).

***U. Humboldtii* (Humboldt's).\*** *fl.* bluish-purple, large, terminal, racemose, on short pedicels; sepals dark fuscous, leafy, convex, ovate, acute; upper lip of the corolla small, entire, slightly inflexed at apex, the lower one dilated, truncate, yellow and excavated at base; spur subulate, ascending-decurved; scape very long, glabrous, sparsely bracteate. *l.* usually solitary, obovate, attenuated into a long petiole. Root fibrous. Guiana, 1886. Stove. (F. d. S. 1390.)

***U. intermedia* (intermediate).** *fl.* pale yellow; upper lip of the corolla far exceeding the palate; scape rather stout, three or four-flowered. July to September. *l.* distichous, closely set,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. broad, orbicular, dichotomously multifid; segments subulate, distinctly ciliated; pitchers on leafless branches,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. Stems slender,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. Europe, &c. (Sy. En. B. 1127.)

***U. minor* (lesser).** *fl.* pale yellow; corolla  $\frac{1}{2}$  in. long, with a minute, obtuse spur; scapes  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, bearing two to six flowers. June to September. *l.* lax,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. broad, orbicular, dichotomously multifid; segments subulate, quite entire; pitchers on the leaf axils, one line long. Stems capillary,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. Europe, &c. (Sy. En. B. 1126.)

***U. montana* (mountain-loving).\*** *fl.* one to four,  $\frac{1}{2}$  in. in diameter; calyx lobes pale green, ovate-cordate, obtuse; corolla white, with a yellow palate and disk to the lower lip; upper lip with recurved edges, the lower one twice as large; spur a stout, incurved horn; scape much longer than the leaves, erect. July. *l.*  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, erect, elliptic-lanceolate, narrowed into slender

**Utricularia**—continued.

petioles. Roots of ovoid, stalked, hollow, green tubers,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long. West Indies, 1871. Stove epiphyte. (B. M. 5923; F. d. S. 1942; F. M. n. s. 83; G. C. 1871, 1039; I. H. n. s. 64.)

**U. m. rosea** (pink). A garden synonym of *U. Endressii*.

**U. neglecta** (neglected). *fl.* pale yellow; upper lip of corolla exceeding the palate; scape very slender. June to August. *l.* smaller than those of *U. vulgaris*, rather remote, nearly orbicular; segments entire. Stems capillary,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. Europe (Britain). (Sy. En. B. 1125 bis.)

**U. reniformis** (kidney-shaped). *fl.* rose-coloured, with two darker-coloured lines,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. across; scape  $\frac{1}{2}$  ft. to  $\frac{1}{4}$  ft. long, many-flowered. *l.* reniform, sometimes  $\frac{3}{4}$  in. across; petioles  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long. Brazil, &c., 1886. A gigantic species.

**U. vulgaris** (common). *fl.* yellow; corolla  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, with a conical spur; scape  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, two to eight-flowered. July and August. *l.* spreading,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, broadly ovate, pinnately multifid; segments remotely toothed; pitchers at the bases of and upon the leaf segments,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, shortly stalked. Stems  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, leafy. Europe (Britain), &c. (Sy. En. B. 1125.)

**UTRICULARIÆE.** Included under *Lentibulariæe*.

**UVARIA** (from *uva*, a cluster of grapes; alluding to the fruits of some of the species). ORD. *Anonacæe*. A genus embracing about thirty-five species of stove, climbing or sarmentose shrubs or under-shrubs, found in tropical Africa and Asia. Flowers yellow, purple, or brown, hermaphrodite, terminal or leaf-opposed, rarely axillary; sepals three, often connate below, broad, valvate; petals six, imbricated in two rows, sometimes connate at base; stamens indefinite. Leaves alternate, entire, exstipulate. Several species formerly included here are now referred to other genera. *U. Kirkii* is a medium-sized under-shrub, and *U. zeylanica* a large, woody climber. Both thrive in a compost of sandy loam and peat. Cuttings of the ripened wood will root in sand, under a glass, in heat.

**U. Kirkii** (Kirk's). *fl.*  $\frac{3}{4}$  in. in diameter, solitary, axillary and sub-terminal; petals pale, dirty straw-colour, suffused with verdigris-green. October. *l.*  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, the young ones elliptic-oblong, and very rusty beneath, the old ones oblong, obtuse or acute, glabrous beneath or with scattered hairs on the midrib; petioles very short. Branchlets ferruginously hairy. *h.*  $\frac{3}{4}$  ft. to  $\frac{1}{2}$  ft. Zanzibar, 1868. (B. M. 6006.)

**U. zeylanica** (Cingalese). *fl.* dull red, solitary or twin,  $\frac{1}{2}$  in. in diameter; peduncles  $\frac{1}{2}$  in. long, tomentose. May. *l.* lanceolate or oblong-lanceolate, acute or acuminate,  $\frac{2}{3}$  in. to  $\frac{3}{4}$  in. long, dark shining green on the upper side, red or pale beneath. *h.*  $\frac{1}{2}$  ft. Ceylon, &c., 1794.

**UVULARIA** (from *uvula*, a diminutive of *uva*, a grape, or bunch of grapes; in allusion to the form of the fruit). Bellwort. Including *Oakesia* (of Watson). ORD. *Liliacæe*. A small genus (four or five species) of hardy, bulbous plants, natives of North America. Flowers solitary or twin at the tips of the branchlets, on rather long, pendulous pedicels; perianth usually pale yellow, campanulate, deciduous, the segments distinct, erect, or spreading above, the outer ones foveolate within at the base; stamens six. Leaves alternate, sessile or perfoliate, ovate or lanceolate. The species thrive in a light, sandy soil, and may be increased by divisions. All flower in spring.

**U. flava** (yellow). A variety of *U. perfoliata*.

**U. grandiflora** (large-flowered).\* *fl.* one to three, on pedicels  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long; perianth  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, the segments lanceolate, acute, three to four lines broad; anthers six to eight lines long. *l.* oblong, membranous, perfoliate, glabrous,  $\frac{2}{3}$  in. to  $\frac{1}{2}$  in. long. 1802. Habit that of *U. perfoliata*, but rather more robust. (B. M. 1112; S. E. B. i. 51.)

**U. lanceolata** (lanceolate-leaved). A form of *U. perfoliata*.

**U. perfoliata** (perfoliate). *fl.* one or few, drooping, terminal; perianth  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, the segments lanceolate, acute, papillose within. *l.* six to twelve, perfoliate, oblong, sub-acute, membranous,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, green above, paler beneath. Stems forked above, *h.* nearly  $\frac{1}{2}$  ft. 1710. (B. M. 985; S. E. B. i. 49.) *U. flava* (S. E. B. i. 50) is a variety with larger and deeper-coloured flowers. *U. lanceolata* is merely a narrow-leaved form.

**U. puberula** (puberulous). *fl.* few, terminal or axillary, on pedicels  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long; perianth nearly  $\frac{1}{2}$  in. long. *l.* six to

**Uvularia**—continued.

fifteen, oblong, sessile,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, acute or cuspidate, firmer than in the other species, green on both sides, the margins ciliated. Stem nearly  $\frac{1}{2}$  ft. high, with two to four branches. 1824. (S. B. F. G. ser. ii. 21.)

**U. rosea** (rosy). A synonym of *Streptopus roseus*.

**U. scissilifolia** (sessile-leaved).\* *fl.* one to three, axillary or terminal, on pedicels  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long; perianth  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, the segments lanceolate. *l.* six to fifteen, oblong, sessile, membranous, acute,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, narrowed at base, slightly glaucous below. Stem glabrous, nearly or quite  $\frac{1}{2}$  ft. high; branches two to four. 1790. (B. M. 1402; L. B. C. 1262; S. E. B. i. 52.)

**VACCARIA.** Included under *Saponaria* (which see).

**VACCINIACEÆ.** A natural order of erect or prostrate shrubs or small trees, often epiphytal, usually inhabiting North temperate regions, but many are South American and Indian; they also occur in Asia, Africa, Madagascar, and Australia. Flowers hermaphrodite, variously disposed; calyx tube adnate to the ovary, the limb five, rarely four to seven, parted; corolla gamopetalous, globose, campanulate, tubular, or inflated, five, rarely four to seven, lobed, or very rarely four or five-parted, the lobes imbricated, rarely valvate; stamens twice as many as, or rarely equalling in number, the corolla lobes, epigynous or adhering towards the base of the corolla; filaments free or connate; anthers two-celled. Fruit baccate, rarely drupaceous, or dry, often very fleshy. Leaves alternate or scattered, occasionally distichous, sessile or petiolate, usually evergreen, entire, crenated, or serrated, the teeth sometimes glanduliferous. The berries of *Vaccinium* and *Oxycoccus* are acid, sweet, and slightly astringent; preserves are made of them, and in some countries they are used as anti-scorbutics. The order embraces twenty-six genera, and about 320 species. Examples: *Cavendishia*, *Psammisia*, *Themistoclesia*, *Thibaudia*, and *Vaccinium*.

**VACCINIUM** (the old Latin name, used by Virgil and Pliny). Bilberry; Blueberry; Cranberry; Huckleberry. Including *Epigynium* (in part). ORD. *Vacciniacæe*. A large genus (about 100 species) of mostly hardy, branched shrubs, rarely trees, very rarely epiphytal, inhabiting North temperate regions and tropical mountains. Flowers white, pink, or red, disposed in axillary or terminal racemes or axillary fascicles, rarely solitary, often bracteate and bibracteolate; calyx tube terete, globose, hemispherical, or turbinate, the limb of four or five short, very rarely unequal lobes; corolla urceolate, campanulate, or rarely nearly tubular or conical, terete, very rarely ribbed or angled, the limb of four or five short, rarely elongated and revolute lobes or teeth; stamens eight or ten, free, or shortly adhering at the base of the corolla tube; filaments short or elongated, often hairy; anthers awned on the back or awnless; bracts sometimes foliaceous. Berry globose, four or five (or apparently eight or ten) celled, the cells few or many-seeded. Leaves persistent, rarely membranous or deciduous, often thickly coriaceous, entire or serrated. All the *Vacciniums* require peat; the hardy ones thriving in any fairly damp, peat border. They may be propagated most readily from seeds, sown under glass, in spring, and the seedling gradually hardened off when large enough. The greenhouse species should be placed in the open air during the summer months, in order to get their wood well ripened. The best-known species are here described. Except where otherwise indicated, they are hardy, deciduous shrubs, from North America; the flowers appear in spring, and the berries, which are sweetish or sometimes acid, and mostly edible, ripen in summer or autumn.

**V. albiflorum** (white-flowered). A synonym of *V. corymbosum pallidum*.

**V. amœnum** (pleasing). A variety of *V. corymbosum*.

**Vaccinium**—continued.

**V. angustifolium** (narrow-leaved). A form of *V. pennsylvanicum*.

**V. arboreum** (tree-like). Farkleberry. *fl.* profuse, axillary along the branches and leafy-racemose; corolla white, moderately five-lobed. *fr.* black, small, globose. *l.* obovate or round-oval to oblong, thinish-coriaceous, very smooth and shining above, reticulate-veined, obscurely glandular-denticulate or entire. Branches spreading, glabrous or somewhat pubescent. *h.* 6ft. to 25ft. 1765. (L. B. C. 1885.) SYN. *V. diffusum* (B. M. 1607)

**V. Arctostaphylos** (Arctostaphylos). A synonym of *V. madrense*.

**Vaccinium**—continued.

**V. caracasana** (Caracasas).\* *fl.* secund, with eight to ten anthers; corolla reddish-white, campanulate; racemes axillary, twice as long as the leaves; bracts lanceolate, nearly equalling the pedicels. July. *l.* elliptic, acute, crenulate, coriaceous, glabrous, shining above. Stem shrubby, erect. *h.* 4ft. Caracasas, 1825. Greenhouse.

**V. corymbosum** (corymbosus).\* *fl.* more often racemously than corymbosely disposed on the naked twigs; corolla white or obscurely rose-coloured, turgid-ovate to cylindraceous-campanulate, three to four lines long. *fr.* usually blue-black, with a copious bloom. *l.* ovate or oblong to elliptic-lanceolate. Branchlets yellowish-green, turning brownish. *h.* 5ft. to 10ft. 1765.



FIG. 146. FRUITING BRANCH OF VACCINIUM LEUCOBOTRYS.

**V. cespitosum** (tufted). *fl.* solitary in the earliest axils, usually five-parted; corolla rose-coloured or nearly white, ovate or ovoid-oblong. *fr.* blue, with a bloom, proportionately large, sweet. *l.* obovate to cuneate-oblong, obtuse or rarely somewhat acute, thickly serrulated, bright green on both sides, reticulate-veined. *h.* 3in. to 6in. 1823. (B. M. 3429; H. F. B. A. ii. 126.)

**V. canadense** (Canadian). *fl.* few in the clusters; corolla greenish-white, shorter, and more open-campanulate. *l.* elliptic or oblong-lanceolate, entire, and, as well as the branchlets, downy with soft, spreading pubescence. Otherwise resembling *V. pennsylvanicum*. 1825. (B. M. 3446.)

**V. c. amœnum** (pleasing). *l.* ciliate-serrulated or bristly-ciliated, rather bright green, slightly or sparsely pubescent. SYNS. *V. amœnum* (A. B. R. 138; B. R. 400), ? *V. c. fuscatum* (B. M. 3433).

**V. c. pallidum** (pale). A pale and very glaucous or glaucescent form, with or without some pubescence, generally low; otherwise nearly as in the preceding variety. SYN. *V. albiflorum* (B. M. 3428).

**V. crassifolium** (thick-leaved). *fl.* few and almost sessile, in small, axillary clusters; corolla nearly white, globose, campanulate. *fr.* black. *l.* ½in. to ¾in. long, oval to narrow-oblong,

**Vaccinium**—continued.

sparsely mucronate-serrulate or entire, shining. Stems slender. trailing, 2ft. to 3ft. long. 1787. Evergreen. (A. B. R. 105; B. M. 1152.)

**V. diffusum** (diffuse). A synonym of *V. arboreum*.

**V. dumosum** (bushy). A synonym of *Gaylussacia dumosa*.

**V. erythrinum** (red-twiggid).\* *fl.* numerous, moderately large, secund, drooping; corolla deep coral-red, urceolate, the limb of five small, reflexed segments; pedicels red; racemes clustered, terminal, 2jin. to 3in. long, sessile or nearly so. October. *l.* alternate, coriaceous, glossy, 1jin. to 2in. long, ovate, rather obtuse, quite entire; young ones stained with red. Young branches red. *h.* 1½ft. Java, 1852. A handsome, warm greenhouse, evergreen shrub. (B. M. 4688; F. d. S. 1115; L. J. F. iv. 364.)

**V. formosum** (beautiful).\* *fl.* in loose clusters; calyx and tardily deciduous bracts red or reddish; corolla rose-red, four to five lines long, cylindrical. *fr.* blue, sweet. *l.* ovate or oblong, entire, 1in. to 2in. long, smooth and bright green above, glabrous or pubescent beneath, rather firm in texture. *h.* 2ft. to 3ft. (A. B. R. 97.)

**V. frondosum** (leafy). A synonym of *Gaylussacia frondosa*.

**V. fuscatum** (fuscous). A form of *V. virgatum*.

**V. Imrayi** (Dr. Imray's). *fl.* large; corolla yellow-green, rather thick; corymbs many-flowered, axillary or terminal, leafy, compact. *l.* shortly petiolate, ovate, acuminate, entire or obsoletely serrated, penninerved, glossy, coriaceous. *h.* 2½ft. to 3ft. Dominica, 1860. A handsome, stove, evergreen shrub. (B. M. 5279.) The correct name of this plant is now *Hornemannia martinicensis*.

**V. leucobotrys** (white-clustered).\* *fl.* glabrous; corolla white, waxy, sub-diaphanous, conico-urceolate; racemes copious from among the leaves, and longer than them, drooping, secund, many-flowered. Summer. *fr.* pure white, with five dark spots in a circle below the apex, copious, about the size of peas. *l.* oblong-lanceolate, deeply serrated, very shortly petiolate. Branches whorled. *h.* 4ft. to 7ft. Bengal, 1859. Greenhouse, evergreen shrub. See Fig. 146. (B. M. 5103, under name of *Epigynium leucobotrys*.)

**V. leucostomum** (white-mouthed). *fl.* three or four in a short, erect, fasciated raceme; corolla scarlet, tipped with white, urceolate-campanulate, with a short limb; bracts small, subulate. *l.* oblong, nearly sessile, thick, slightly crenate, obsoletely nerved, ½in. to 1in. long. Branches erect, angled. Peruvian Andes, 1848. A glabrous, evergreen shrub. (G. C. 1848, p. 7.)

**V. macrocarpum** (large-fruited). A synonym of *Oxycoccus macrocarpus*.

**V. maderense** (Madeira). *fl.* on axillary, drooping pedicels; corolla greenish-white, campanulate, sub-cylindrical; racemes leafy. *l.* oblong, attenuated at both ends, serrulated, pubescent beneath. Stem arborescent. *h.* 6ft. Madeira, 1777. SYN. *V. Arctostaphylos* (A. B. R. 30; B. M. 974).

**V. Mortinia** (native name).\* *fl.* in very short, drooping racemes, crowded, shortly pedicellate; corolla rose-pink, ½in. long, with five small, recurved teeth. *l.* rather crowded, ½in. to ¾in. long, spreading and reflexed, ovate- or lanceolate-oblong or ovate, acute, thickly coriaceous, slightly serrated; petioles very short. Branches pubescent or nearly glabrous. *h.* 2ft. to 3ft. Andes, 1834. Half-hardy shrub. (B. M. 6872.)

**V. Myrsinites** (Myrsinites). *fl.* in fascicles or very short racemes, shortly pedicellate; corolla white or rose-coloured, five-toothed, at length cylindraceous, two to three lines long; bracts reddish, tardily deciduous. *fr.* blue, globose. *l.* obovate and obtuse to oblong-lanceolate and acute or spatulate, often cuspidate, ½in. to 1in. long, sometimes denticulate, mostly shining above, dull or paler and sometimes glaucous beneath. Branchlets pubescent when young. *h.* 9in. to 2ft. 1794. Evergreen. (B. M. 1550, under name of *V. nitidum decumbens*.) SYN. *V. Sprengelii* (of gardens).

**V. myrtilloides** (Myrtillus-like). *fl.* solitary in the earliest axils, usually five-parted; corolla yellowish- or greenish-white, tinged with purple, globose-urceolate, nearly two lines long. *fr.* purplish-black, rather acid. *l.* ovate or oval and oblong, sharply serrulated, membranous, green on both sides but not shining, 1in. or more long, the larger or later ones mostly acute or acuminate. Branchlets slightly angled. *h.* 1ft. to 5ft. (B. M. 3447.)

**V. Myrtillus** (Myrtillus). Bilberry; Bleberry; Blueberry; Common Whortleberry, &c. *fl.* solitary, on naked peduncles, ½in. long; corolla rosy, tinged with green, globose, ½in. in diameter. *fr.* dark blue, ½in. in diameter, glaucous. *l.* ovate, ½in. to 1in. long, serrated, reticulate-nerved, rosy when young. Stems many, erect, 6in. to 2ft. high. Europe (Britain), Asia, and America. (F. D. 974; Sy. En. B. 879.)

**V. nitidum** (shining). *fl.* in fascicles or very short racemes; calyx teeth and almost persistent bracts very obtuse; corolla rose-red or turning white, rather broad, two lines long. *fr.* black, somewhat pear-shaped. *l.* obovate to oblanceolate-oblong, ½in. to ¾in. long, thick-coriaceous, shining, at least above, obscurely denticulate and glandular. *h.* 1ft. to 2ft. 1794. A diffuse, much-branched, very leafy, evergreen shrub. (A. B. R. 480.)

**Vaccinium**—continued.

**V. ovatum** (ovate-leaved). *fl.* in short and close, axillary clusters; corolla rose or flesh-coloured, campanulate, two lines long, five-parted. *fr.* reddish, turning black, small, rather sweet. *l.* thick and firm, very numerous, oblong-ovate to oblong-lanceolate, acute, minutely and acutely serrated, glabrous or nearly so, 1in. or so long, bright green on both sides. Branchlets pubescent. *h.* 3ft. to 5ft. 1826. An erect, rigid, evergreen shrub. (B. R. 1354; L. B. C. 1605; L. J. F. iv. 424.)

**V. Oxycoccus** (Oxycoccus). A synonym of *Oxycoccus palustris*.

**V. pennsylvanicum** (Pennsylvanian).\* *fl.* on very short pedicels, in fascicles or short racemes; corolla white or obscurely rose-coloured, campanulate with the corifice slightly contracted, barely ½in. long. *fr.* bluish-black and glaucous, large and sweet, ripening early. *l.* oblong-lanceolate or oblong, green and somewhat shining on both sides, glabrous or sometimes hairy on the midrib beneath, distinctly serrulated with bristle-pointed teeth. Stems green and warty, mostly glabrous. *h.* 9in. to 12in. or more. 1772. (B. M. 3434.)

**V. p. angustifolium** (narrow-leaved). Bluets. A dwarf form (9in. or less in height), with lanceolate leaves. SYN. *V. angustifolium*.

**V. reflexum** (reflexed-leaved). *fl.*, corolla red, coriaceous, rather acutely five-angled; corymbs small, short, few-flowered, or many-flowered and then sub-globose, sub-terminal and axillary. January. *l.* small, reflexed or horizontally spreading, ½in. to ¾in. long, almost sessile, oblong-lanceolate, acute, sharply serrated except at the base; young ones bright pale red. Stem branched from the base; branches 1ft. to 2ft. long, sparingly divided, leafy, pendulous. Bolivia, 1869. Greenhouse evergreen. (B. M. 5781.)

**V. resinosa** (resinosa). A synonym of *Gaylussacia resinosa*.

**V. Rollisoni** (Rollison's). *fl.* on spreading pedicels, drooping; corolla rich scarlet, the limb of five acute lobes; racemes always terminal, nearly sessile, four to six-flowered. *l.* about ½in. long, obovate, sub-cuneate, coriaceous, glossy, entire, sometimes retuse. Branchlets angled. *h.* 2ft. or more. Java, 1851. An erect, much-branched, slightly hairy, leafy, stove, evergreen shrub. (B. M. 4612.)

**V. rugosum** (wrinkled). A synonym of *Pentapterygium rugosum*.

**V. Sprengelii** (Sprengel's). A garden synonym of *V. Myrsinites*.

**V. stamineum** (thready).\* Deerberry; Squaw Huckleberry. *fl.* nearly all axillary; corolla dull purplish or yellowish-green, deeply five-cleft; awns of the anthers very much shorter than the elongated tubes. *fr.* greenish or yellowish, large, pear-shaped or globular, mawkish. *l.* pale and dull or glaucous, especially beneath, oval to lanceolate-oblong. Branches diverging, minutely pubescent or at length glabrous. *h.* 2ft. to 3ft. 1772. (A. B. R. 263.)

**V. tenellum** (tender). A variety of *V. virgatum*.

**V. uliginosum** (swamp-loving). *fl.*, corolla pale pink, ½in. long sub-globose; peduncles one to three together, ½in. long, one-flowered. *fr.* smaller than in *V. Myrtillus*. *l.* oblong or obovate, ½in. to 1in. long, obtuse or acute, quite entire, coriaceous, glaucous beneath. Stems 6in. to 10in. long, naked below, procumbent; branches ascending. Arctic regions of Northern hemisphere. (F. D. 231; Sy. En. B. 878.)



FIG. 147. FLOWERING BRANCH OF *VACCINIUM VITIS-IDEA*.



**Vaccinium**—*continued*.

**V. virgatum** (twiggy). *fl.* on short pedicels; corolla rose-coloured, three to four lines long; clusters sometimes twiggy on naked branches. *fr.* black, sometimes with a bloom. *l.* obovate-oblong to cuneate-lanceolate, or oblong-lanceolate, usually acute or pointed and minutely serrulated, rather thin, *lin.* or so long. *h.* 5ft. Shrub more or less pubescent. (A. B. R. 181; B. M. 3522; W. D. B. i. 33, 34.) *V. fuscatum* (B. R. 302) is a form of this species, having deep rose-coloured flowers and red pedicels and bracts, approaching *V. formosum*.

**V. v. tenellum** (tender). *fl.* nearly white, in shorter or closer clusters; corolla barely  $\frac{1}{2}$  in. long. *l.* mostly small. A low form.

**V. Vitis-Idæa** (Vine of Mount Ida).\* Brawlings; Cowberry; Flowering Box, &c. *fl.* crowded in short, terminal, drooping racemes; corolla pink, campanulate. *fr.* red, globose,  $\frac{1}{2}$  in. in diameter, acid. *l.* obovate,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, green above (like Box), dotted beneath, very coriaceous, bifarious, the margins revolute, thickened, entire or minutely serrulated. Stems wiry, tortuous, procumbent; branches 6 in. to 18 in. long, trailing or ascending. Europe (Britain). Evergreen. See Fig. 147. (F. D. 40; Sy. En. B. 877.)

**VACUOUS**. Empty; a term applied to cases when an organ does not contain what usually belongs to it. Bracts which usually support flowers are said to be Vacuous when they have no flowers in their axils.

**VAGIFORM**. Having no certain figure.

**VAGINA**. A sheath; e.g., a petiole rolled round a stem.

**VAGINATE**. Sheathed.

**VAGINULARIA**. Included under *Monogramme*.

**VAILLANTIA** (named in honour of Sebastian Vaillant, 1669-1722, an eminent French botanist, author of "Botanicon Parisiense"). Syn. *Valantia*. ORD. *Rubiaceæ*. A genus including two or three species of small, branched, annual herbs, natives of South Europe, the Mediterranean region, and Western Asia. Flowers white or yellow, small, ternate. Leaves in whorls of four, lanceolate or obovate. The species are of no interest from a horticultural standpoint.

**VALANTIA**. A synonym of *Vaillantia* (which see).

**VALDESIA**. A synonym of *Blakea* (which see).

**VALDIVIA** (so called from the town of Valdivia, in Chili, in the neighbourhood of which the genus is found). ORD. *Saxifragæ*. A monotypic genus. The species is a singular and ornamental, small, half-hardy, evergreen shrub, with short, terete stems, probably now lost to cultivation.

**V. Gayana** (Gay's). *fl.* red, pedicellate, few in a short, axillary, hairy raceme; calyx five-lobed, the tube adnate with the ovary; petals five to seven, perigynous, linear, acuminate, bearded within at the base; stamens five to seven. *l.* ample, alternate and sub-opposite, obovate-lanceolate, acute, argutely glandular-erose or toothed, membranous; stipules wanting. *h.* 6 in. Chili to Valdivia, 1863.

**VALERIAN**. See *Valeriana*.

**VALERIANA** (a mediæval name, said to be derived from *valere*, to be healthy; in allusion to its powerful medicinal qualities). Valerian. ORD. *Valerianææ*. A large genus (nearly 150 species) of mostly hardy, perennial herbs, sub-shrubs, or shrubs, mostly inhabiting North temperate regions and extra-tropical South America; a few are natives of Brazil or the East Indies. Flowers white or pink; calyx at first entire, but forming a feathery crown at fruiting time; corolla with a short or rarely elongated tube and a five-cleft, spreading limb; stamens three, rarely one or two by abortion. Fruit compressed. Leaves, especially the radical ones, entire or toothed, or the cauline ones (or all) pinnatifid, or once, twice, or thrice pinnatisect. Few of the species have any horticultural merit. The medicinal qualities of *V. officinalis* are, however, extensive. Those described below are hardy perennials; they thrive in common soil, and may be readily increased by divisions.

**V. angustifolia** (narrow-leaved). A synonym of *Centranthus angustifolius*.

**Valeriana**—*continued*.

**V. Calcitrapa** (Calcitrapa). A synonym of *Centranthus Calcitrapa*.

**V. Cornucopiæ** (Cornucopia). A synonym of *Fedia Cornucopiæ*.

**V. dioica** (dioecious). Marsh Valerian. *fl.* pale rose-coloured, mostly unisexual, in terminal corymbs; corolla tube short. Early summer. *l.*, radical ones and those of the runners long-stalked, ovate, entire,  $\frac{1}{2}$  in. to  $\frac{1}{2}$  in. long; cauline ones few, mostly pinnate, with one terminal segment and several pairs of smaller ones, all entire. Flowering stems 6 in. to 8 in. high. Europe (Britain). (Sy. En. B. 666.)

**V. montana** (mountain-loving). *fl.* pink; corymbs at length paniculate. July. *l.*, lower ones oblong or obovate, obtuse, slightly toothed; upper ones lanceolate, acute. *h.* 9 in. Mountains of Europe, 1748. Plant glabrous or slightly pilose, erect. (J. F. A. 269; L. B. C. 317.)

**V. m. rotundifolia** (round-leaved). *l.*, lower ones nearly round. Stems dwarfer than in the type. (B. M. 1825.)

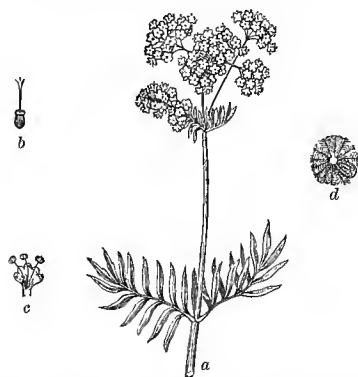


FIG. 148. *VALERIANA OFFICINALIS*, showing (a) Upper Portion of Plant; (b) Flower, with Corolla removed; (c) Corolla, cut open; (d) Plumose Crown of Fruit.

**V. officinalis** (official). All-heal; Common Valerian; St. George's Herb, &c. *fl.* pink; corymb contracted or loose, at length sub-paniculate. June. *l.* all, or nearly all, pinnatisect; segments seven or eight pairs, lanceolate, serrated. Stems sulcate. *h.* 5ft. Europe. A very variable species. See Fig. 148. (B. M. Pl. 146; F. D. 570; Sy. En. B. 666.)

**V. Phu.** *fl.* white, in a paniculate corymb. August. *l.*, radical ones oblong or elliptic, undivided; cauline ones pinnately lobed, the lobes oblong. Stem terete, smooth. *h.* 2ft. Caucasus (an escape from cultivation in Europe). Plant glabrous, erect.

**V. P. aurea** (golden).\* This only differs from the type in the bright golden-yellow colour of the young growths in spring.

**V. ruthenica** (Russian). A synonym of *Patrinia sibirica*.

**V. sibirica** (Siberian). A synonym of *Patrinia sibirica*.

**VALERIANÆÆ**. A natural order of annual or perennial herbs, sub-shrubs, or rarely shrubs, mostly found in temperate and frigid regions of the Northern hemisphere, copious in Western America and the Andes, rarely found in tropical Asia, Brazil, Guiana, and the West Indies. Flowers cymose or solitary; calyx tube adnate to the ovary, often small, sometimes obsolete; corolla white, pale blue, red, or (in *Patrinia*) yellow, superior, gamopetalous, the base of the tube often attenuated, gibbous or spurred, the limb spreading, three to five-cleft or bilabiate; stamens one to four, inserted below or above the middle of the tube, often exserted; filaments free; anthers two-celled; cymes terminal or axillary, clustered, or loosely corymbose or paniculate. Fruit dry, indehiscent. Leaves opposite, exstipulate, often mostly radical or clustered at the base of the stem, entire or toothed; cauline ones sometimes few, small, or wanting, sometimes many, entire, or often as large as the radical ones, and toothed, pinnatifid, or once, twice, or thrice pinnatisect. The medicinal qualities of *Valerianææ* have been known from ancient times; the plants now take rank at the head of the vegetable anti-

**Valerianæ**—continued.

spasmodics. The order includes nine genera, and about 300 species. Examples: *Centranthus*, *Nardostachys*, *Patrinia*, *Valeriana*.

**VALERIANELLA** (a diminutive of *Valeriana*). **SYNS.** *Fedia* (of Gärtner), *Odontocarpa*, *Polypremum* (of Adanson). **ORD.** *Valerianæ*. A genus comprising about fifty species of small, hardy, dichotomously-branched, annual herbs, natives of Europe, North Africa, West Asia, and North America. Flowers whitish, pale bluish, or pink; calyx limb toothed, lobed, or wanting; corolla tube short or rarely elongated, the limb spreading, five-cleft; stamens three; cymes sometimes fastigiate corymbose-paniculate, sometimes densely globose at the tips of the branches; bracts free. Radical leaves rosulate, entire; cauline ones entire, toothed, or rarely incised-pinnatifid. *V. carinata* and *V. olitoria* are the only species calling for description in this work. For cultural directions, &c., see **Corn Salad**.

**V. carinata** (keeled). Corn Salad. *fr.* oblong, boat-shaped; fertile cell not corky; calyx limb indistinct. Europe (Britain). Sir J. D. Hooker regards this as "probably a variety of *Fedia olitoria*, which it resembles in all characters save those of the fruit."

**V. olitoria** (culinary). Common Corn Salad; Lamb's Lettuce; White Potherb. *fl.* pale lilac, minute, in capitate cymes. April to June. *fr.* minute, glabrous or hairy; fertile cell corky on the back, the empty ones contiguous or confluent; calyx limb wanting. *l.* lin. to 3in. long, linear-oblong or oblong-lanceolate, quite entire or toothed; cauline ones half-amplexicaul. *h.* 6in. to 12in. Europe (Britain), &c. An excellent salad. See also **Corn Salad**.

**VALERIAN, GREEK.** A common name for **Polemonium ceruleum** (which see).

**VALERIAN, LONG-SPURRED.** A common name for *Centranthus macrosiphon* (which see).

**VALERIAN, RED OR SPUR.** See *Centranthus ruber*.

**VALERIANWORTS.** The plants of the natural order *Valerianæ*.

**VALLARIS** (perhaps from *vallo*, to inclose; the plants are said to be used in Java for fences). **SYNS.** *Emericia*, *Peltanthera*. **ORD.** *Apocynaceæ*. A small genus (five or six species) of tropical Asiatic and Malayan, stove, twining shrubs. Flowers white, cymose or fascicled; calyx five-parted, glandular or not within; corolla salver-shaped, with a short tube, a naked throat, and broad lobes; stamens at the top of the tube, the filaments very short, clavate. Leaves opposite, minutely dotted. For culture of *V. Pergularia*, the only species introduced, see **Vallesia**.

**V. Pergularia** (*Pergularia*). *fl.* with a disagreeable, goat-like smell; cymes glabrous or puberulous. *l.* broadly elliptic or obovate, or rounded abruptly, shortly acute, membranous, 4in. to 7in. long, 3in. to 4in. broad, glabrous or puberulous beneath; petioles lin. to 1½in. long. Bark pale. India, 1818.

**VALLESIA** (name commemorative of Francisco Valles, physician to Philip II. of Spain; he died in 1592). **ORD.** *Apocynaceæ*. A small genus (two species) of American, much-branched, glabrous, stove shrubs or small trees. Flowers small, cymose; calyx five-parted, without glands; corolla salver-shaped, annulate or pilose within the throat, the lobes five, ovate or lanceolate, twisted; stamens included below the apex of the tube. Leaves alternate, lanceolate or oblong. It is doubtful whether *V. dichotoma* is still in cultivation. A compost of sandy loam and peat suits it. Propagation may be effected by means of cuttings, inserted in sand, under a glass, in heat.

**V. dichotoma** (dichotomous). *fl.* white, ½in. long, numerous; cymes dichotomous, half the length of the leaves. May. *l.* ovate-oblong, acute, obtuse at base, 2in. to 2½in. long, rugose-tubercled and pellucid-dotted; young ones pubescent. Branches dichotomous, terete. *h.* 3ft. Peru, 1822.

**VALLISNERIA** (named after Antonio Vallisneri, 1661-1730, an Italian botanist, Profeseor at Padua). **ORD.** *Hydrocharideæ*. A monotypic genus. The species is a half-hardy, aquatic, submerged herb, found in fresh-water lakes, ditches, &c. It is largely grown in aquaria in this country, and requires to be planted deeply in the water.

**V. spiralis** (spiral). Eel Grass; Tape Grass. *fl.* white, minute, apparently forming an ovoid or globular head not quite so long as the dioecious, shortly bi- or trifid spathes. July. *l.* very long and narrow when the water is deep, short in shallow water, obtuse or acute and more or less minutely toothed at the ends, or sometimes perhaps quite entire. Stems very short, sometimes stoloniferous. Warm and temperate regions, 1818. The male flowers are borne on a very short peduncle, and are sessile on a conical axis. At the flowering period, the female peduncle gradually lengthens, so that the flower finally floats on the surface of the water. Then the male submerged flowers detach themselves spontaneously from their peduncle and rise to the surface. After fertilisation, the peduncle of the female flower contracts spirally, and the ovary descends to the bottom of the water to ripen its seeds.

**VALLONEA OAK.** See *Quercus Ægilops*.

**VALLOTA** (named after Pierre Valot, a French botanist, who wrote a description of the Royal Gardens in 1623). **ORD.** *Amarylloideæ*. A monotypic genus. The species is a beautiful, greenhouse, bulbous plant. It requires a soil composed of good, fibrous loam, leaf mould, and sand, in equal parts. The bulbs should be placed from 6in. to 8in. below the level of the surface of the soil, and surrounded with sand, after which they may be covered with the compost, which should be pressed firmly around them. They should not be disturbed for years, and will ultimately establish themselves and produce grand masses of blossom. The best season for planting a fresh stock is June and July, when they commence root action before the flower-stems are sent up. If the surface of the soil in which the bulbs are planted be covered with green Saxifrage or Sedum, it will give a very neat and pleasing appearance when the plants are in flower. During their growing season, and in dry weather, an occasional soaking of water or liquid manure will prove very beneficial to Vallotas.

**V. purpurea** (purple).\* Scarborough Lily. *fl.* 3in. to 4in. long, several in an umbel, sessile or shortly pedicellate; perianth red, funnel-shaped, straight, erect, the tube short, the throat enlarged, the lobes oblong-ovate, connected at base by a small callus; stamens erect, equal; involucral bracts two or three, membranous; scape robust, fistular, 2ft. to 3ft. high. May. *l.* equalling the scape, lanceolate-linear, entire, obscurely reticulate-veined. South Africa, 1774. (R. H. 1870, 50.)

**V. p. eximia** (choice).\* *fl.* of the same shade of colour as in the type, 4in. across, chiefly distinguishable for the white throat, with crimson feather, not unlike what is seen in some varieties of *Gladioli*. (F. M. ser. i. 225.)

**V. p. magnifica** (magnificent). This is hardly distinct from *V. p. eximia*, though its raisers consider it larger, brighter in colour, and a more robust grower than any other. It was exhibited with flowers 5in. across. (Gn. xxx., p. 245.)

**V. p. major** (greater). *fl.*, perianth reddish-scarlet, the throat hyaline-fenestrate; anthers longer. **SYN.** *Amarylhis purpurea* (B. M. 1430).

**V. p. minor** (lesser). *fl.*, perianth cherry-red, the throat opaque-fenestrate; anthers shorter. (B. R. 552.)

**VALONIA.** A commercial name for the acorn-cups of *Quercus Ægilops*.

**VALVATE, VALVULAR.** United by the margins only; opening as if by doors or valves, as do most indehiscent fruits and some anthers.

**VALVES.** The doors by which various bodies open; the term is also applied to the pieces into which a capsule splits.

**VALVES.** In all heating arrangements by hot water, Valves are requisite for regulating the passage of heat to different houses and pits, and for shutting it off altogether from any part when not required. The ordinary kind, which can easily be opened or closed with one

**Valves**—*continued.*

hand, answers very well for the mere purpose of regulating heat. A high-pressure Valve, the aperture in which is opened and closed by means of a screw and thread, is sometimes put in near the boiler when there is more than one main, or when two boilers are connected for working both together and separately. When these Valves are screwed down, the water cannot circulate or pass, and this is of great advantage in case of repairs being necessary to one of the boilers, as the other can meanwhile be kept at full work. High-pressure Valves are not required on all boilers, but sufficient of the ordinary kind should be introduced where necessary to insure the apparatus being worked readily and the regulation of heat kept under easy control.

**VANDA** (the Indian name of the original species). **ORD. Orchideæ.** A genus embracing about thirty species of very beautiful, stove, epiphytal Orchids, natives of the East Indies and the Malayan Archipelago, one being also found in tropical Australia. Flowers showy or rarely mediocre, shortly pedicellate, usually fragrant; sepals and petals free, sub-equal, much spreading, often narrowed or nearly clawed at base; lip continuous with the column, spreading, saccate or obtusely spurred at base, the lateral lobes erect, rounded or reduced to auricles, the middle one spreading; column short, thick, wingless; pollen masses two; bracts short; racemes simple, loose; peduncles lateral. Capsules often on rather long pedicels. Leaves distichous, spreading, coriaceous or slightly fleshy, often emarginate or shortly bilobed at apex, flat or (in *V. Hookeriana* and *V. teres*) terete. Stem leafy, not pseudo-bulbous. The Vandas require more light than most other Orchids; indeed, many successful growers do not use shading for them at all. During the period of growth, say from March or April until about October, a high temperature and abundance of moisture are essential: the thermometer should not fall below 70deg. or 75deg. during the day, and may be allowed to rise to 85deg. or even higher in sunny weather. The night temperature during the growing season should not fall more than about 10deg. below that maintained during the day. In the winter months, 60deg. or 65deg. at night will be sufficient, and less water will be required—none being allowed to lodge in the axils of the leaves. The most rational method of growing the plants is to fix them in baskets, filled three-fourths of their depth with broken pots-herds, and the rest with clean, fresh sphagnum. If rafts or blocks of wood are employed, more care is necessary in watering, for, if an insufficient supply is given, the leaves are apt to shrivel and the lower ones to fall off. As pots are more readily moved, they are frequently employed by exhibitors; the directions as to cultivation in baskets should be followed if pots are used. *V. cœrulea* requires less heat than the other kinds; indeed, it succeeds sometimes better under almost cool treatment. *V. teres* should be placed close to the glass, in a warm, sunny house, and supplied with abundance of water when growing; when at rest, less will suffice. Should the plants of any of the tall-growing species become too high, the tops may be cut off and potted in potsherds and sphagnum. New growths often spring from the base of the old plants, and from the stems of those which have been cut back; these allow the species to be readily propagated.

**V. alpina** (alpine). *fl.* pale green, small; sepals and petals oblong; lip yellowish, streaked with dull purple, gibbous below the apex, emarginate; basal hollow deep purple; raceme subsessile, erect, two or three-flowered. *l.* channelled, recurved, obliquely (sometimes acutely) bilobed. Khasya, 1837. *Syn. Luisia alpina.*

**V. Batemanni** (Bateman's). A synonym of *Stauroopsis Batemanni*.

**V. Bensoni** (Benson's). *fl.* white outside, about 2in. in diameter; sepals and petals yellowish-green, dotted with reddish-brown on the inside, obovate, obtuse; lip pink, with a violet, reniform apex, ovate in front, convex, trifurcate on the disk, the small

**Vanda**—*continued.*

basal auricles and conical spur white; scapes rigid, 1ft. high. *l.* coriaceous, lorate, channelled, toothed at apex. Rangoon, 1866. (B. M. 5611; F. d. S. 2329; G. C. 1867, 180.)

**V. bicolor** (two-coloured). *fl.* white externally, yellowish-brown inside, with obscure, livid tessellations, less than 2in. across; sepals and petals falcate; lip lilac, with large, white auricles, giving the base a broad, cordate appearance, dotted with lilac and tinged with yellow; raceme erect, rigid, few-flowered, longer than the leaves. *l.* lorate, coriaceous, half-twisted in the middle, very oblique and somewhat three-toothed at apex. Bhotan, 1875.

**V. cœrulea** (blue). *fl.* sometimes as much as 5in. across; sepals and petals pale blue, membranous, oblong, obtuse, shortly stalked; lip deep blue, small, coriaceous, oblong-linear, the point obtuse, with two diverging lobes; racemes ten or more-flowered; scapes erect, much longer than the leaves. Autumn. *l.* loriform, channelled, coriaceous, unequally truncate, with acute lateral lobes. Stem erect, 2ft. to 3ft. high. Khasya, 1849. A very handsome plant. (F. d. S. 609; I. H. 246; L. J. F. 102; L. & P. F. G. 1. 36; R. X. O. 1. 5; W. S. O. 18.) *V. c. grandiflora* is a fine, large-flowered variety. (R. H. 1881, p. 290.)

**V. cœrulescens** (bluish). *fl.* ten to twenty on a slender, erect, axillary scape; sepals and petals pale mauve-blue, cuneate-ovate, twisted at the clawed base; lip violet, obconate, dilated, emarginate, with lilac-purple auricles, the spur tipped with green. Spring. *l.* coriaceous, ligulate, dark green, 5in. to 7in. long, truncately bilobed. Stems elongated. Burmah, 1869. A pretty little species. See Fig. 149 (for which we are indebted to Messrs. Veitch and Sons). (B. M. 5834; F. M. ser. ii. 256; G. C. 1870, p. 529; W. O. A. i. 48.)

**V. c. Boxallii** (Boxall's). *fl.*, sepals and petals white, tinged with lilac; front lobe of the lip dilated, deep violet, bordered with white; disk dark blue-striped; raceme rather close, on a short scape. *l.* obliquely erose at apex. 1877. (B. M. 6328.)

**V. c. Lowiana** (Low's). Similar to *Boxallii*, but having an amethyst-coloured middle lobe of lip and a dot of amethyst at each end of the sepals. 1877.

**V. Cathcarti** (Cathcart's). *fl.* 3in. across; sepals and petals white outside, yellow with reddish-brown bands internally, sessile, concave, roundish-oblong; lip three-lobed, the lateral lobes white, red-streaked at base, small, the middle lobe whitish, with a yellow, crenate, incurved border; disk with two erect calli; scape erect, leaf-opposed, four or five-flowered. *l.* 6in. to 7in. long, linear-oblong, unequally bilobed, pale green. Sikkim Himalayas, 1864. A tall, scrambling species. (B. M. 5845; C. H. P. 23; F. d. S. 1251-2; F. M. ser. ii. 66; G. C. 1870, 1409; I. H. 187; W. O. A. iv. 158.) *Arachnanthe Cathcarti* is now the correct name of this species.

**V. concolor** (one-coloured). *fl.* rather distant, numerous, in elongated, lateral racemes; sepals and petals white outside, cinnamon-brown within, oblong-obovate, wavy; lip three-lobed, downy at base, the side lobes white with rosy dots, the middle one cinnamon-brown, cuneate and bilobed at apex; spur attenuated. *l.* membranous, evergreen, lax, obliquely three-toothed at apex. Stems erect, 5ft. to 6ft. high. China, 1850. (B. M. 3416, under name of *V. Roxburghii unicolor*.)

**V. cristata** (crested). *fl.*, sepals and petals yellow-green, oblong, obtuse, the petals incurved; lip buff, striped with rich purple, divided at the end into two or three narrow, acute, diverging, unequal lobes; racemes erect, three to six-flowered, shorter than the leaves. March to July. *l.* channelled, recurved, truncate and three-toothed at apex. Stems erect. Nepal, 1818. (B. M. 4304; B. R. 1842, 48; R. G. 680.)

**V. Denisoniana** (Denison's). *fl.* thick and fleshy, medium-sized; sepals and petals white, slightly tinged with green, the dorsal sepal and petals spatulate; lip white, pandurate; the apex two-lobed, the base with two nearly quadrate auricles; spur short, conical; racemes axillary, five or six-flowered, on stout, ascending peduncles. April. *l.* lorate, rigid, recurved, sharply bilobed at apex, dark green. Stems erect. Aracan Mountains, 1869. (B. M. 5811; F. & P. 1869, p. 250; G. C. n. s., xxiv, p. 105; I. H. ser. iii. 105.)

**V. D. hebraica** (Hebrew-marked). *fl.*, sepals and petals sulphur-coloured on both sides, but darker within and with spots and bars resembling Hebrew letters; anterior part of the blade of the lip olive-green; spur orange inside. July. Burmah, 1885. (W. O. A. 248.)

**V. D. punctata** (dotted). *fl.* sulphur-coloured, with some brown spots on the petals and odd sepal, the middle and base of the lip white.

**V. densiflora** (dense-flowered). A synonym of *Saccolabium giganteum*.

**V. fuscoviridis** (fuscous-green). *fl.* about 1½in. across, having a slightly fishy smell; sepals and petals dull brown, with a little greenish-yellow at the edge, the petals clawed, falcate, broader than the sepals; lip pure greenish-yellow, tomentose at base, five-furrowed, bilobed; spur cylindrical; racemes short, few-flowered. Spring. *h.* 1ft. Java, 1848. (G. C. 1848, p. 351; L. & P. F. G. ii. p. 20.)

**V. gigantea** (gigantic). A synonym of *Stauroopsis gigantea*.

**Vanda**—continued.

**V. Goweræ** (Gower's). A garden name for *V. undulata*.

**V. Griffithii** (Griffith's). *fl.* yellow, brown, and lilac, much smaller than those of *V. cristata* (which this species resembles); sepals linear-oblong, recurved; petals acuminate; lip ovate, elongated, furrowed, concave at base. *l.* channelled, recurved, sharply and unequally three-lobed. Bhotan.

**V. hastifera** (halbert-bearing). *fl.* many in a loose raceme; sepals and petals light yellow, blotched with red inside; lip white, marked with brown and mauve, the lateral lobes semi-oblong,

**Vanda**—continued.

**V. Hookeriana** (Hooker's).\* *fl.* 2½ in. across, membranous; sepals white, tinted with rose; petals larger, white, spotted with magenta, undulated, spatulate-oblong; lip cuneate at base, three-lobed, 1½ in. broad, white, lined and spotted with magenta-purple; a large, deep purple auricle on each side of the column; raceme two to five-flowered; peduncle leaf-opposed. September. *l.* erect, 2 in. to 3 in. long, terete, pale green, subulate-pointed. Stems rooting, elongated, terete. Borneo. (I. H. ser. iii. 484; W. O. A. ii. 73.)

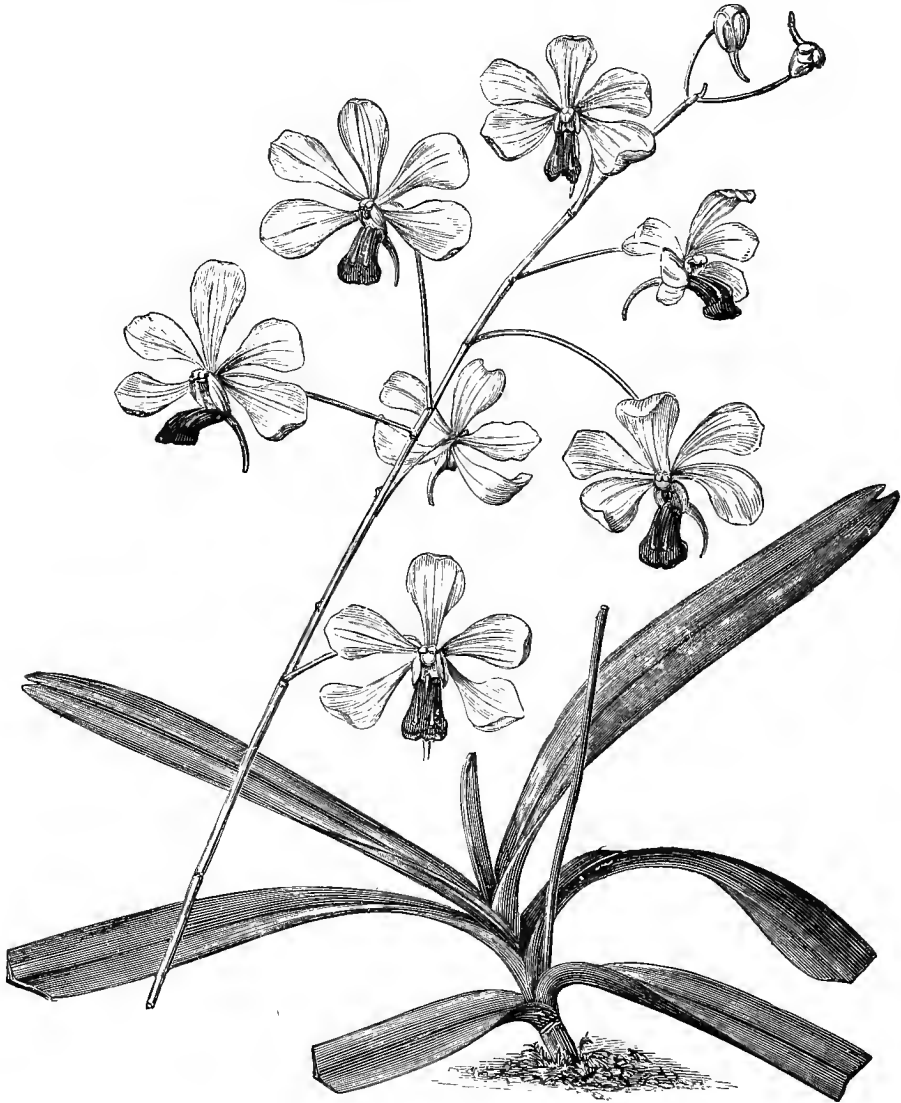


FIG. 149. VANDA CÆRULESCENS.

triangular, the front lobe halbert-shaped, covered with hairs at its base. *l.* linear-ligulate, erose at apex. Sondaic Archipelago, 1884. A rare, tall-growing Orchid.

**V. helvola** (pale red). *fl.* wine-red, shading into pale purple; lateral sepals connivent under the lip; lateral lobes of the lip bright purple, short, the middle lobe triangular-hastate, tumid inside and a little furrowed, concave beneath, the little sac having a pair of small callosities on the side opposite the column; raceme erect, shorter than the leaves, about three-flowered. March and April. *l.* rigid, slightly undulated, carinate at base, oblique and obtuse at apex. Java, 1850.

**V. insignis** (remarkable).\* *fl.* 2½ in. across; sepals and petals light brown, spotted with chocolate-brown internally, yellowish-white outside, obovate-spathulate; lip large, almost fiddle-shaped, the side lobes white, short, the front one white, suddenly expanding into a concave, semi-lunar limb of light purplish-rose; racemes about as long as the leaves, five to seven-flowered. May and June. *l.* channelled, rigid, linear-ligulate, curving, unequally cut or denticulate at apex. Stems sub-erect. Moluccas, 1846. (B. M. 5759; L. & P. F. G. ii., p. 19; W. O. A. iv. 172; W. S. O. 3.)

**V. i. Schröderiana** (Baron Schröder's). *fl.*, sepals and petals light yellow; lip pure white, with a large, concave, anterior limb

**Vanda**—continued.

Autumn. Malay Islands, 1883. A very chaste and distinct novelty.

**V. lamellata** (plated). *fl.* pale yellow, streaked with dull, pale red, in long, loose, erect racemes; sepals and petals obovate, undulated, the lower ones larger and slightly incurved; lip with two diverging, elevated lines, acute, obconate, retuse; auricles small, rounded; spur short, cylindrical-conical, hairy within. August. *l.* coriaceous, obliquely and acutely bidentate. Philippines, 1837.

**V. l. Boxallii** (Boxall's).\* *fl.*, dorsal sepal creamy-white, the inner part of the lateral ones reddish-brown tinged with purple; petals white; limb of the lip rich magenta-rose towards the front, the disk with six reddish-purple stripes running back to the mouth of the tube; racemes fourteen to twenty-flowered. November and December. *l.* much recurved. Stems erect. 1880. (G. C. n. s., xv., p. 87; Gn. xix. 287.)

**V. limbata** (bordered). *fl.* 2 in. across; sepals and petals cinnamon-brown, blotched and tessellated with darker reddish-brown, evenly bordered with yellow, tinged with lilac outside; lip rosy-lilac, margined with white, quadrate, slightly pandurate, the disk tumid, with five to seven parallel furrows; racemes loose, erect, about twelve-flowered. June. *l.* 8 in. to 10 in. long, channelled, coriaceous, obliquely retuse at apex. Stems stout, with long, thick roots. Java, 1875. (B. M. 6173; W. S. O. ser. iii. 9.)

**V. Lindeni** (Linden's). *fl.* disposed in a handsome raceme; sepals and petals light yellow, with red dots on the disk, cuneate-oblong, wavy; lip whitish-yellow, with nearly square side lobes and a triangular, two-edged middle lobe produced into a sharp angle under two tumours at the apex, sulcate beneath, with a linear, velvety, ascending auricle on each side at the base, and three furrows over the disk, the tumours and side-lobes purple-spotted, the disk marked with four purple lines, the tip under the tumours brownish; spur conical, hairy inside. Sunda Isles, 1886.

**V. Parishii** (Parish's).\* *fl.* large; sepals and petals greenish-yellow, dotted with reddish-brown, cuneate-oblong, acute; lip strongly and peculiarly scented, the front lobe pale magenta, narrowly margined with white, rhomboid, gibbous below the apex, with a median keel and a violet, conical callus at base; spur short, gibbous; auricles white, orange-striped; scape erect, several-flowered. Summer. *l.* broadly ligulate, obtuse, unequally bilobed, fleshy, bright green. Moulmein, 1870. A handsome, dwarf species. (W. O. A. i. 15.)

**V. P. Marriottiana** (Sir W. H. S. Marriott's). *fl.* not scented; sepals and petals bronzy-brown, suffused with magenta; lip having a rich magenta, rhomboid front lobe and white basal auricles; raceme about six-flowered. *l.* slightly emarginate. Stems closely leafy. 1880. (W. O. A. ii. 61.)



FIG. 150. PORTION OF INFLORESCENCE OF *VANDA PARVIFLORA*.

**V. parviflora** (small-flowered). *fl.*, sepals and petals pale yellow, oval; lip funnel-shaped, the broadly oblong, rounded front lobe white, with purple crests on the fleshy disk, and dotted with lilac; spur short, conical; racemes short, erect, many-flowered. Summer. *l.* lorate, obliquely and obtusely bilobed at apex, with an intermediate cusp. India. A beautiful little plant. See Fig. 150. *Syns.* *V. testacea*, *Aërides testaceum*, *A. Wightianum* (B. M. 5138; F. d. S. 1452.)

**V. Roxburghii** (Roxburgh's).\* *fl.*, sepals and petals pale green, with chequered lines of olive-brown, oblong-obovate, the outer surface white; lip violet-purple and convex in the front part, deeper purple towards the apex, the lateral lobes white, lanceolate; spur pinkish, short; racemes six to twelve-flowered, on erect peduncles. Summer. *l.* ligulate, recurved, channelled,

**Vanda**—continued.

coriaceous, obliquely three-toothed at apex. Stems erect, dwarfish, stout. Bengal, 1850. (B. M. 2245; B. R. 506; F. d. S. Feb. 1846, 641, f. 2; L. & P. F. G. ii. 42, f. 2; W. O. A. 59.) Of this species there are several varieties, one having a dark blue lip, and another, *V. tessellata* (P. M. B. vii. 265; I. H. n. s. 579, *V. R. rubra*) a pink lip.

**V. Sanderiana** (Sander's).\* *fl.* flat, about 4 in. across; dorsal sepal and the smaller petals pink, slightly stained with buff-yellow, the lateral sepals 2 in. across, pale nankeen outside, within greenish-yellow, reticulated with dull crimson; lip small, concave, pale purplish-red at base, the tip chocolate-purple, strongly recurved, three prominent keels extending from base to apex; racemes axillary, many-flowered. September and October. *l.* broadly ligulate, coriaceous, recurved, 9 in. to 12 in. long, deeply channelled. Philippine Islands, 1881. (G. C. n. s., xx., pp. 440-1; I. H. ser. iii. 532; W. O. A. iii. 124.)

**V. S. labello-viride** (green-lipped). A distinct variety, having a green lip. Mindanao, 1886.

**V. Stangeana** (Stange's). *fl.* four or five in a raceme; sepals and petals internally at first greenish, afterwards ochre, tessellated with dark purple-brown; auricles of the lip blunt, white with yellow and some mauve-blue spots, the middle lobe white with mauve-blue or wholly mauve-blue, cordate-triangular. Assam, 1885. (R. X. O. ii. 102.)

**V. suavis** (sweet).\* *fl.* large and handsome, freely produced, fragrant; sepals and petals pure white outside, spotted and barred with blood-purple within, the dorsal sepal and two petals sub-lobate; lip convex, three-lobed, the front lobe pale rosy-purple, narrow, deeply bifid, the lateral ones deeper rosy-purple, ovate, flat; racemes bold, elongated, on axillary peduncles. *l.* lorate, flaccid, recurved, dark green, obliquely toothed at apex. Java, 1847. A noble plant for exhibition purposes. (B. M. 5174; F. d. S. 641, f. 3, (*Hrubiana*) 16045; G. C. n. s. xxii., p. 237, Wingate's var.; L. & P. F. G. ii. 42, f. 3; R. X. O. i. 12; W. O. A. iv. 180.)

**V. s. flava** (yellow). *fl.* yellow, with broad, oblong, rich brown spots. (B. M. 4432, under name of *V. tricolor*.)

**V. s. Gottschalckel** (Gottschalck's). *fl.* deliciously scented, larger and stouter than in the type; sepals and petals more densely spotted; lip bright rose-purple, tipped with white; pedicels deeply tinged with rose. *l.* (and stem) stouter than in the type. 1869.

**V. s. Lindeni** (Linden's). *fl.*, sepals, petals, and base of lip white, spotted with purple, the rest of the lip purple. 1886.

**V. teres** (terete).\* *fl.* large; sepals oblong, the dorsal one white, slightly tinged with rose, the lateral ones creamy-white, twisted, parallel with the lip; petals rose-magenta, lighter towards the margins, larger, sub-orbicular, undulated; lip bright rose-magenta, enculate, large, strongly veined, the throat orange, striped and spotted with crimson, the apex dilated and emarginate; spur conical; racemes leaf-opposed, mostly two-flowered. June to August. *l.* (and stems) terete, dark green. Burmah, &c. 1828. A handsome, straggling or climbing species, several feet long. (B. M. 4114; B. R. 1809; P. M. B. v. 193; R. H. 1856, 22.)

**V. t. Andersoni** (Anderson's). *fl.* richer and deeper in colour, freely produced; racemes 10 in. long, five or six-flowered. (W. S. O. ser. iii. 2.)

**V. t. aurea** (rosy). *fl.*, sepals white; petals white, slightly rose-tinted; throat light ochre, with rosy lobes, which are furnished with two rows of small, purple dots; column light rose-purple. 1884.

**V. t. candida** (white). *fl.* white. A distinct and beautiful form.

**V. teretifolia** (terete-leaved). A synonym of *Sarcanthus teretifolius*.

**V. tessellata** (tessellated). A form of *V. Roxburghii*.

**V. testacea** (tile-coloured). A synonym of *V. parviflora*.

**V. tricolor** (three-coloured).\* *fl.* white outside, handsome, fragrant; sepals and petals pale yellow spotted with brownish-red within, oblong-obovate, obtuse; lip three-lobed, the middle lobe rose-magenta, paler at the tip, convex, cuneate, deeply emarginate, the disk marked with five white lines, the basal lobes white, erect, rounded; spur white, short, compressed; column white, short, thick; racemes short, dense, on axillary peduncles. *l.* lorate, channelled, recurved, obliquely bilobed and somewhat erose at apex. Stems erect, tall. Java, 1846. (F. d. S. 641; L. J. F. 136; L. & P. F. G. ii. 42; W. O. A. ii. 77.) The following varieties of this superb species are enumerated by B. S. Williams, in the sixth edition of the "Orchid Grower's Manual": DALKETH, a very highly-coloured form; DOWNSIDE, flowers large, and very rich in colour and markings.

**V. t. Corningii** (Corning's). *fl.*, sepals and petals rich yellow, spotted and streaked with deep crimson, margined on both surfaces with rosy-purple; lip very plum-colour, softened off to pale rose towards the base. *l.* large, dark green, stout.

**V. t. Dodgsoni** (Dodgson's). *fl.* very highly scented, borne in great numbers on the racemes; sepals and petals light amber, streaked and blotched with reddish-brown, and margined with violet; lip rich violet-purple, with a few white blotches near the base.

**Vanda**—continued.

**V. t. insignis** (remarkable). *fl.*, sepals and petals light yellow, spotted with crimson; lip pale lilac. Generally spring and autumn. This handsome variety was formerly known in gardens as *V. insignis*.

**V. t. Patersoni** (Paterson's). *fl.* about 2 in. in diameter, appearing on very small plants; sepals and petals creamy-white, densely spotted with cinnamon-brown, broad; lip bright magenta. (G. C. n. s., xxii., p. 236.)

**V. t. planilabris** (flat-lipped). *fl.* larger and brighter-coloured than in the type; sepals and petals citron-yellow, thickly spotted with rich brown, very broad, clawed or narrowed to the base; lip rose-coloured, margined with purplish-mauve, and striped with chocolate-purple on the disk, large and flat. (W. O. A. ii. 87.)

**V. t. Russeliana** (Russel's). *fl.* very bright-coloured, in long racemes. A beautiful variety, having a peculiar, pendulous style of growth; it is very robust.

**V. t. Warneri** (Warner's). *fl.*, sepals and petals distinctly margined with deep rose; lip deep rosy-purple. *l.* linear, lorate, peculiarly ribbed. (W. S. O. ser. ii. 39.)

**V. undulata** (waved). *fl.* white, very freely produced in racemes; sepals and petals lanceolate, much undulated; lip having the lateral lobes greenish, and marked with orange lines on the disk. *l.* coriaceous, ligulate, unequally bilobed. India, 1875. This has been sold under the name of *V. Goverae*.

**V. violacea** (violet). A synonym of *Saccolabium violaceum*.

**V. Vipan** (Vipan's). *fl.*, sepals and petals blunt, rhomboid, white externally, within pale at the base, marked with short, brownish-purple lines, the rest of the sepals brownish-olive, and of the petals inclining to ochre, all striped with dark brown-purple; middle lobe of the lip olive-green, the side auricles yellow. *l.* very long and narrow. Burmah, 1882.

**VANDELLIA** (named in honour of Dominico Vandelli, Professor of Botany at Lisbon, who wrote a work on Portuguese plants in 1623). Including *Tittmannia* (of Reichenbach). ORD. *Scrophularinæ*. A genus embracing about thirty species of stove, greenhouse, or hardy, often annual, branched herbs, inhabiting warm regions. Flowers rather small, solitary in the axils, sessile or pedicellate, or in terminal racemes; calyx five-parted or five-toothed; corolla bilabiate, the upper lip emarginate or shortly bifid, the lower one large, three-lobed; stamens five, perfect. Leaves opposite, often toothed. The few species introduced are now probably lost to cultivation.

**VANDESIA**. A synonym of **Bomarea** (which see).

**VANESSA**. A genus of Butterflies, conspicuous by their size (varying from 2½ in. to 2½ in. in spread of wings), their bright colours, and the bold markings on the upper surface of the wings; the lower surface is dull-coloured for concealment. The front wings have a distinct tooth above the middle of the hind margin, and the inner margin is nearly straight. The hind wings usually have a short

**Vanessa**—continued.

antennæ have the terminal club rather long. The front legs are small and useless for walking. The larvæ are long and worm-like, but covered with stiff spines on all but the first ring. The pupæ are angular; they hang by the tip of the body, and frequently bear golden or silvery-metallic spots here and there, or over most of their surface. The Butterflies are single-brooded each year, except the Small Tortoiseshell, which has a succession of broods. Most of the species hibernate as Butterflies, appearing on warm days during winter. There are five British species of the genus, viz., *V. Antiopa* (Camberwell Beauty), *V. Atalanta* (Red Admiral), *V. Io* (Peacock, see Fig. 151), *V. polychloros* (Great Tortoiseshell), and *V. Urtica* (Small Tortoiseshell). Of these *V. Antiopa* feeds on various Willows, and *V. polychloros* on Elm; but both are local or scarce in Britain. The other *Vanessæ* feed on Nettles. The Butterflies may be distinguished from one another by the colour of the upper surface of the wings.

*V. Antiopa* (rarely seen in England) has a span of about 3 in. across the wings; the latter are purplish-brown, with broad, yellow or yellowish-white borders, margined on the inner side with a broad, black band, in which are six or seven blue spots.

*V. Atalanta* has the wings nearly black, with a broad, deep red band across the middle of the front wings, and round the hind margin of the hind wings; the band on the hind wings has four black spots in it. Each front wing bears six white spots near the tip, and there is a blue and black spot at the hind angle of each hind wing.

*V. Io* is of the size and form shown in Fig. 151; the ground-colour is dull red, the margins are brown, the eye-like spots on the wing are variously shaded with black, lilac, red, yellow, and white; those on the hind wings are bordered with grey-brown.

*V. polychloros* and *V. Urtica* are very like one another, both having tawny-orange wings, with a dark border inclosing blue spots; and in both there are three large, black spots, separated by yellow spots, on the front border, and two small, black spots near the middle, of the front wings; and the basal part of the hind wings is dark. The two species differ as follows: *V. polychloros* is usually over, and *V. Urtica* is under, 2½ in. in spread of wings. The latter species has a white spot on the front margin of the front wings, near the tip, where the former species has a yellow spot, and in *V. polychloros* there is a black spot more on the inner border of the front wings, and the blue spots in the dark borders of the front wings are faint or absent. *V. Urtica* is one of the earliest of British Butterflies, and is conspicuous in almost all parts of the country.

Those species of *Vanessa* that feed on Nettles are beneficial; while the others are never numerous enough in Britain to call for a special remedy.

**VANGUERIA** (*Voa* - *Vanguer* is the Madagascar name of *V. edulis*). SYNS. *Meynia*, *Rytigymia*, *Vanguiera*, *Vavanga*. ORD. *Rubiaceæ*. A genus comprising about thirty species of stove shrubs and small trees, sometimes spiny, inhabiting tropical and sub-tropical regions (except in Australia). Flowers white or greenish, small, cymose or fasciated; calyx tube short, the limb five, rarely four, toothed or lobed, or irregularly five to ten-toothed; corolla tube short or mediocre, the limb of five, rarely four or six, ovate, acute, acuminate, or appendiculate, at length reflexed lobes; stamens five. Fruit a dry or fleshy drupe, sometimes edible and rather large. Leaves opposite, coriaceous or membranous; stipules interpetiolar, frequently connate in a persistent ring. *V. edulis* and *V. velutina* are the only species calling for description in this work. They thrive in a compost of loam and peat. Propagation may be effected by cuttings, inserted in similar soil, under a glass, in heat.

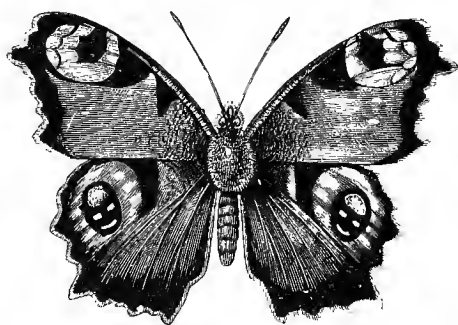


FIG. 151. VANESSA IO.

tooth in the hind margin (see Fig. 151). In the middle of the hind wing is a space bounded on all sides by the wing veins; the sixth and seventh veins are not united, but arise directly from the vein bounding the space. The



**Vangueria**—continued.

**V. edulis** (edible-fruited). *fl.* green; cymes springing from below the leaves. June. *fr.* resembling an apple, but not crowned, succulent, edible, containing five stones. *l.* ovate, membranous, glabrous. *l.* 12ft. Madagascar, 1809. A small, unarmed tree.

**V. velutina** (velvety). *fl.* pale yellowish-green, axillary in the lower leaves, in short, dense cymes. May. *l.* large, opposite, nerved, shortly petiolate, cordate-ovate, rather acute, entire, much waved, mostly downy beneath. *l.* 3ft. Madagascar, 1829. A softly-tomentose shrub. (B. M. 3014.)

**VANGUIERA.** A synonym of **Vangueria** (which *see*).

**VANHOUTTEA.** A synonym of **Houttea** (which *see*).

**VANILLA** (from the Spanish *vainilla*, a little sheath; in allusion to the shape of the fruit). **SYN.** *Myrobroma*. **ORD.** *Orchidæ*. A genus embracing about a score species of stove, tall-climbing, branched Orchids, scattered over tropical regions. Flowers large, but usually dull-coloured and uninteresting, in axillary, often short racemes or spikes; sepals and petals sub-equal, free, spreading; claw of the lip adnate with the elongated, wingless column, the limb broad, concave, its base rolled around the column; bracts ovate. Capsule often elongated, fleshy, not (or at length scarcely) dehiscent. Leaves coriaceous or fleshy, nerved, sessile or shortly petiolate. *Vanilla* is remarkable in being the only genus of the order which possesses any economic value. The fruit of several species is largely employed, under its botanical name, for flavouring chocolate, liqueurs, ices, &c. *V. planifolia* produces the best Vanilla. Only four species call for description in this work. They should be potted or planted out in a narrow bed, in peat and sphagnum, and trained up a wall or on a thick piece of wood. A strong heat is favourable to their well-being. Propagation may be effected by cuttings; the climbing stems produce roots, and may be out into lengths for the purpose.

**V. bicolor** (two-coloured). *fl.* very fragrant, 3in. long; sepals and petals dull red, acute, spreading; lip cream-coloured, half-free, convolute, apiculate, undulated; column bearded. *l.* ovate-oblong, sub-sessile, acute, striated, reddish on the margins. Demerara.

**V. lutescens** (yellowish). *fl.* 6in. across, showy, two or more together from the axils of the leaves, somewhat resembling in general appearance those of *Cattleya citrina*; sepals and petals greenish-yellow; lip very bright yellow. Ia. Guayra, 1859. (F. d. S. 2218.)

**V. Phalenopsis** (Phalenopsis-like). *fl.* 3in. across, six or seven in an umbel; sepals faint bluish-white, keeled behind, acute, the two lateral ones divided to the base on the lower side; petals the same colour, but less acute, channelled; lip pale rosy-blush outside, tawny-orange within, over 1in. long, broadly funnel-shaped. Stems long, rooting, leafless. Madagascar, 1869. An interesting species. (F. d. S. 1769.)

**V. planifolia** (flat-leaved). *fl.* wholly green, or white within, or with a white lip, 2in. across; sepals and petals lanceolate-oblong; lip callous below the serrulated, repand summit, and crested at the middle with minute, recurved scales. *fr.* 6in. long, sub-cylindrical. *l.* fleshy, 5in. to 7in. long, oblong or ovate-oblong, acute, contracted at base. Stem cylindrical. West Indies, 1800. (A. B. R. 538; B. M. Pl. 272; L. B. C. 733.)

**VANILLA PLANT.** *See* **Trilisa odoratissima**.

**VAPOUR.** Moisture which, in heated plant-structures especially, arises from the soil, walls, paths, &c., when watered, and from evaporating-troughs filled with water and placed on the hot-water pipes. Vapour in an invisible state is continually ascending from damp, heated substances; hence the feeling of moisture in the air of the interior of plant-houses, &c., and sometimes outside after rain.

**VAPOURER MOTH.** *See* **Orgyia antiqua**.

**VARGASIA.** A synonym of **Thounia** (which *see*).

**VARIEGATED.** Irregularly coloured.

**VARIETY.** A sort or modification subordinate to a species. A Variety can only be propagated with cer-

**Variety**—continued.

tainty by grafts, cuttings, bulbs, tubers, or any other method which produces a new plant by the development of one or more buds taken from the old one. If the Variety generally comes true from seed, it is often called a Race.

**VARIOLATE.** Marked as if by the pustules or pittings of small-pox.

**VARNISH-TREE.** A common name for *Ailantus glandulosus*, *Melanorrhœa usitatissima*, *Rhus vernicifera*, &c.

**VARRONIA.** A synonym of **Cordia** (which *see*).

**VASCOA.** Included under *Rafnia*.

**VASCONCELLEA.** Included under *Carica*.

**VASCULAR.** Furnished with, or relating to, vessels or ducts.

**VASCULAR SYSTEM.** Under this name are included all those parts of plants in which true **Vessels** (which *see*) occur. As the latter are found only in flowering plants, and in Vascular Cryptogams (Ferns, Horsetails, Club-mosses, and their allies), there is no Vascular System in the remaining groups of Cryptogams, *i.e.*, in the True Mosses, Liverworts, Algæ, Lichens, and Fungi. It is often represented, or rather foreshadowed, among the Mosses and some of the species in the other groups, by bundles or strings of long, tapering cells, which, to some extent, do the same work. The Vascular System is present in the roots, stems, branches, and leaves of the Vascular Plants. It remains when continued steeping in water, or exposure to the weather, has caused the decay of all the softer cells in these plants, so that it forms the skeleton or framework on which the plants are built up. It is best seen in those parts in which the bundles or strings of which it consists are always separated by cellular tissue from one another, *e.g.*, in leaves, and in the stems of Monocotyledons and Ferns, and in young stems of herbaceous Dicotyledons. In the stems and roots of woody Dicotyledons it becomes more difficult to recognise the true nature of the Vascular System, owing to the formation of annual rings of wood and of bast by the cambium layer just below the bark.

The chief uses of the Vascular System are twofold, *viz.*: (1) It gives strength and mechanical support to all parts of the plant, serving as the framework for the cellular tissues, in which the work of preparing the food goes on; (2) the wood, in the Vascular System, is the channel of communication for conveying the crude sap upwards from the soil to the leaves, and the soft bast in each bundle is believed to be the chief channel by which the protoplasmic food-substances are conveyed from the leaves, in which they are prepared, to the growing points, where they are used up in forming new structures, or to the parts (tubers, seeds, &c.) where they are stored up for future use. *See* **Sap**.

**VASCULUM.** A botanist's collecting-box. The term is also applied to a pitcher-shaped leaf.

**VASES.** There are various kinds of Vases in use, both for growing plants in, and also for arranging cut flowers. Vases for terrace walls and other positions in formal flower-gardening, and also for conservatory embellishment, are made in various sizes, and in great variety of design. Terra-cotta is largely employed in their manufacture, as it withstands all weathers, and is well adapted for the purpose. Vases are also made of stone and cast iron, amongst other substances. For the arrangement of cut flowers for table and room decorations, glass Vases are best—flowers do not look so well in anything else—but sometimes silver, old china, or other valuables, are used for the purpose of exhibiting them, in addition to making them receptacles for flowers. China and glass

**Vases—continued.**

Vases may be procured in the greatest ranges of variety, and in shapes and sizes which suit all individual requirements. It is unnecessary to describe the various kinds, but those known as Trumpet Vases or Glasses are amongst the best for cut flowers. In dinner-table decoration the Vases should be low in stature, or, if one or more Trumpet Glasses are used down the centre, so lightly arranged with flowers that nothing shall be caused in the way of an obstruction to the view from one side of the table to the other.

**VAUANTHES.** A synonym of **Grammanthes** (which see).

**VAVANGA.** A synonym of **Vangueria** (which see).

**VEGETABLE BUTTER.** See **Bassia butyracea**.

**VEGETABLE EARTH,** or **VEGETABLE MOULD.** Soil largely mixed with humus or decayed remains of plants (see **Humus**). It is usually very dark, but the colour varies with the proportion of humus, and of the other constituents of the soil. Good Vegetable Mould may contain from 3 to 25 per cent. of humus, and is usually very fertile. A higher percentage of plant-remains is unfavourable, as organic acids are apt to be formed and to accumulate in the soil, to the detriment of most plants, though some species of wild plants prefer such a soil, e.g., several prefer peat, which consists of little but humus. To render such soils as contain excess of humus fertile, it is necessary to add certain manures or other substances to them in order to hasten the decay of the vegetable remains, and to bring them into a condition fit for the nutrition of the plants for which the ground is to be prepared. See also **Humus**.

**VEGETABLE FIRE-CRACKER.** A common name for **Brodiaea coccinea** (which see).

**VEGETABLE HAIR.** A common name for **Tillandsia usneoides** (which see).

**VEGETABLE HORSEHAIR.** The fibre of *Chamærops humilis*.

**VEGETABLE IVORY.** The nuts of *Phytelphas macrocarpa*.

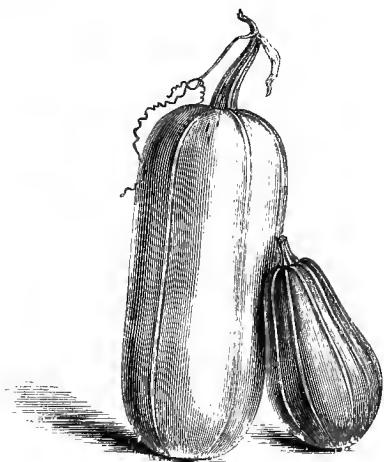


FIG. 152. FRUITS OF VEGETABLE MARROW.

**VEGETABLE MARROW** (*Cucurbita Pepo ovifera*). A half-hardy, trailing annual, of very easy culture, grown

**Vegetable Marrow—continued.**

in nearly every garden during summer for the fruits, which are chiefly used when about half-grown, or even in a younger state (see Fig. 152), for cooking in various ways. At these stages the flesh is exceedingly tender, but as the fruits get old it becomes drier. Cultivators sometimes allow a portion of their crop to ripen, for the purpose of converting the fleshy portion into jam, or the fruits may be kept in a dry place when ripe until midwinter for cooking. Seeds of Vegetable Marrows should be sown singly, or two in a 3in. pot, towards the end of April, and placed in a gentle heat. So soon as the plants have two rough leaves, they should be hardened by being placed in a situation where air can be admitted. Early in June, they may be planted out where they are intended to remain, and covered for a few days with hand-glasses until re-established, when the glasses may be removed. Old manure heaps are the best positions for the plants, as on these they grow and fruit abundantly. Plenty of water should be supplied throughout the summer whenever the weather is dry, and the fruit should be cut when large enough for cooking, unless required for ripening to produce seed or for using in one of the ways above mentioned. The growths need an occasional thinning during summer when they get too much crowded.

**SORTS.** The following are amongst the best sorts of cultivated Vegetable Marrows:

**BUSH MARROW**, of compact, bushy habit, not a trailer; free. **CUSTARD**, free-bearing and of good flavour. **HIBBERN'S PROLIFIC**, fruit small, egg-shaped. **LONG WHITE**, fine cropper; the best for general use, and when only one variety is grown. **MOORE'S VEGETABLE CREAM**, free-bearing, and of fine flavour. **MUIR'S PROLIFIC HYBRID**, an oval-shaped, cream-coloured variety; prolific. **PEN-Y-BYD**, fruit delicate creamy-white, nearly globular, with firm flesh; plant short-jointed and prolific; very distinct.

**VEGETABLE OYSTER.** See **Tragopogon porriolifolius**.

**VEGETABLE REFUSE.** After being made up into a compost, and allowed to ferment for some time, Vegetable Refuse of all kinds can be most advantageously employed as manure. This treatment is especially advisable when the Refuse contains a fair proportion of woody substance, as the latter can scarcely serve as manure for plants until it has undergone chemical decomposition to some extent. When the proportion of woody substance is large, it is well to burn the Refuse slowly, in a covered heap, in which the fire is kept smouldering, but is never allowed to burst into flame. Other kinds of Refuse should be made up with layers of earth and quicklime. The latter destroys the weeds, and hastens their decay. Another good method of forming a compost is to mix the Refuse with earth, and occasionally drench the heap with liquid manure. This promotes the formation of Ammonia; and gypsum should be mixed with the earth to form Sulphate of Ammonium, which prevents the loss of the alkali, and adds much to the value of the compost. Quicklime must not be mixed with the earth, as it sets free Ammonia, which escapes as a gas into the atmosphere, and is lost. Both of these composts are excellent garden manures.

**VEGETABLE SCULPTURE.** See **Topiary Work**.

**VEGETABLE TALLOW PLANT.** A common name for **Stillingia sebifera** (which see).

**VEINLET.** One of the ultimate or smaller ramifications of a vein or rib.

**VEINS.** In general, any ramifications or threads of fibro-vascular tissue in a leaf or any flat organ (especially those which divide or branch) through which sap is carried into the parenchyma.

**VEITCHIA** (named in honour of the late James Veitch, of Chelsea, the leading nurseryman of his day). *ORD. Palmæ.* An imperfectly-known genus (four species have been indicated) of stove Palms, inhabiting the Fiji Islands and the New Hebrides. Male flowers much smaller than the females; spathes three (♂), deciduous; spadix shortly and thickly pedunculate, the branches elongated, fastigiate, thickened at base. Fruit about 2ft. long, ellipsoid or fusiform-ovoid and slightly beaked, or sub-globose. Leaves terminal, equally pinnatisect; pinnae linear or acuminate, unequally truncate, the margins thickened. Only two species are at present grown in gardens. For culture, see **Kentia**.

**V. Canterburyana** (Canterbury's). A synonym of *Hedyoscepe Canterburyana*.

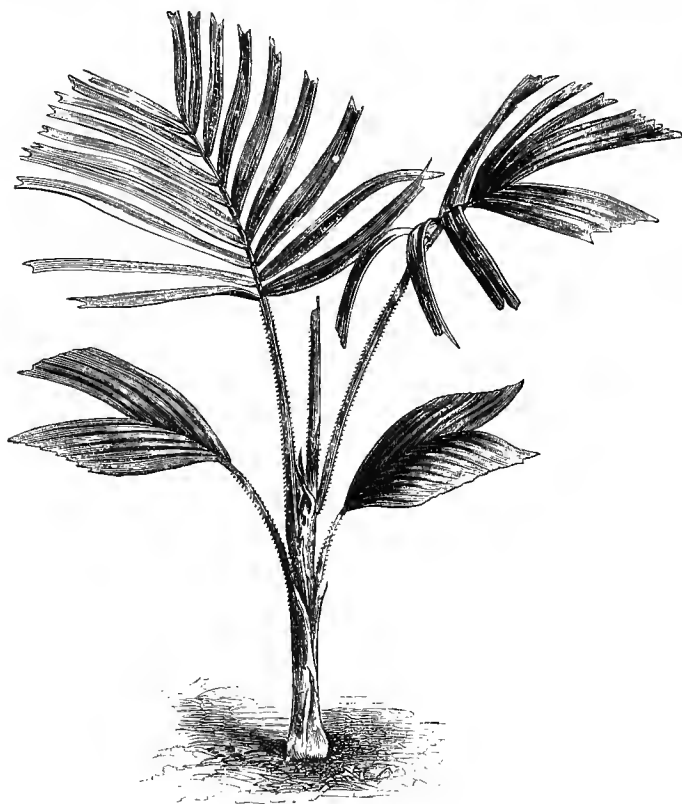


FIG. 153. VEITCHIA JOHANNIS.

**V. Johannis** (John Veitch's). \* *fl.* minute; spadix much branched, the branches forming large bunches. *fr.* at first green, at length bright orange, red at base, ovoid-ellipsoid. *l.*, pinnae minutely toothed, the midrib terminating in a small curve, the apex obliquely truncate. Fiji, 1868. "Seedlings have, from the first, a straight stem, their sheath, petiole, and rachis being of a dark blood-colour, and covered when young with a grey tomentum, which is interspersed with lancet-shaped, thin, dark red lepidia" (Wendland, in Seemann's "Flora Vitiensis"). See Fig. 153. *SYN. Kentia Joannis*.

**V. Storekii** (Storek's). *fl.*, spadix resembling that of *Cocos nucifera*, much and repeatedly branched; principal branches triangular, the lower ones having as many as twelve branchlets. *fr.* ellipsoid, with a slender, blunt taper. *l.*, pinnae coriaceous, glabrous on both sides, much folded towards the base, and furnished with three prominent, longitudinal ribs, the two lateral ones of which are close to the margins. Trunk hard and smooth, dark brown below, light brown above. *h.* 40ft. Fiji. *SYNS. Kentia elegans* (of gardens), *K. Storekii*.

**VEITCHIA** (of Lindley). Included under **Picea** (which see).

**VELAGA.** A synonym of **Pterospermum** (which see).

**VELANI OAK.** See **Quercus Ægilops**.

**VELASQUEZIA.** A synonym of **Triplaris** (which see).

**VELEZIA** (named in honour of Franc. Velez de Arciniega, a Spanish writer on medicinal botany). *ORD. Caryophyllæ.* A genus embracing four species of hardy, annual herbs, inhabiting the Mediterranean region and Western Asia. Flowers sub-sessile, solitary in the axils or clustered at the tips of the branchlets; calyx acutely five-toothed; petals five, inconspicuous. Leaves subulate. Two of the species have been introduced, but they possess no horticultural value.

**VELLA** (of uncertain derivation, said to be Latinised from *Veler*, a Celtic name for such a plant). *ORD. Crucifera.* A small genus (three species) of small, much-branched, greenhouse or half-hardy shrubs, natives of Spain. Flowers yellow, rather large, sub-spicate, the lower ones bracteate; sepals erect, equal at base. Leaves entire. *V. Pseudo-cytisus*, the only species calling for mention here, is sometimes grown as a greenhouse plant, but is sufficiently hardy to endure the winter if planted in a dry, warm, south border. It may be multiplied by young cuttings, inserted in sand, under a glass.

**V. Pseudo-cytisus** (False Cytisus). *Cress* Rocket. *fl.*, petals yellow, with long, dark purple claws; pedicels very short. April and May. *l.* alternate, obovate, entire, rough with hairs. *h.* 2ft. to 3ft. 1759. (B. R. 293.)

**VELLEIA** (named after Major Velley, who was greatly interested in *Algæ*; he died in 1806). Including *Euthales*. *ORD. Goodeniæ.* An Australian genus embracing eleven species of greenhouse, perennial herbs, having (except *V. macrophylla*) a short, thick stock and radical leaves. Flowers yellow, like those of *Goodenia*, but the calyx is free from the ovary; scapes (or peduncles in *V. macrophylla*) erect or ascending, di- or trichotomously branched, many-flowered; bracts opposite, free or connate. Four of the species are known to cultivation, and require similar treatment to that recommended for **Goodenia**.

**V. lyrata** (lyrate-leaved). *fl.*, sepals three; corolla about ½ in. long, the lobes broadly winged; scapes 6 in. to 12 in. high, dichotomous, with spreading branches. April. *l.* oblong-spathulate, deeply toothed below the middle or lyrate-pinnatifid, often several inches long. 1819. (B. R. 551; H. E. F. 24.)

**V. macrophylla** (large-leaved). *fl.* in large, loose, dichotomous panicles; peduncles axillary. July. *l.*, cauline ones usually 2 in. to 6 in. long, toothed and narrowed into a rather long petiole. Stem erect, leafy, branching 3ft. to 4ft. high. 1839. Closely allied to the larger forms of *V. trinervis*. *SYN. Euthales macrophylla* (B. 209; B. R. 1841, 3.)

**V. paradoxa** (paradoxical). *fl.*, sepals five, free; corolla pubescent outside, sometimes spurred; scapes 6 in. to 18 in. high, di- or trichotomously branched. July. *l.* petiolate, from broadly ovate and under 2 in., to narrow-oblong and above 4 in. long, coarsely toothed or almost entire, sometimes quite entire. 1824. (B. R. 971.)

**V. trinervis** (three-nerved). *fl.*, calyx campanulate, with five unequal lobes; corolla five to six lines long, the lobes all broadly winged; scapes dichotomous, low and ascending or above 1ft. high. July. *l.* on long petioles, broadly or narrowly oblong, entire or remotely toothed. 1803. *SYNS. Goodenia tenella* (A. B. R. 446; B. M. 1137), *Euthales trinervis*.

**VELLOZIA** (called after a Portuguese naturalist named Velloz, who edited the works of Vandelli on Brazil).

**Vellozia**—*continued*.

SYN. *Xerophyta*. ORD. *Amaryllideæ*. A genus comprising about fifty species of stove and greenhouse plants, with fibrous, woody, erect, sometimes arborescent stems, natives of tropical and South Africa, Madagascar, and

**Vellozia**—*continued*.

base; stamens six, sometimes indefinite and collected in clusters; peduncles terminal, one-flowered. Leaves clustered at the tips of the branches, sometimes short, narrow, and straight, sometimes elongated, narrowly or

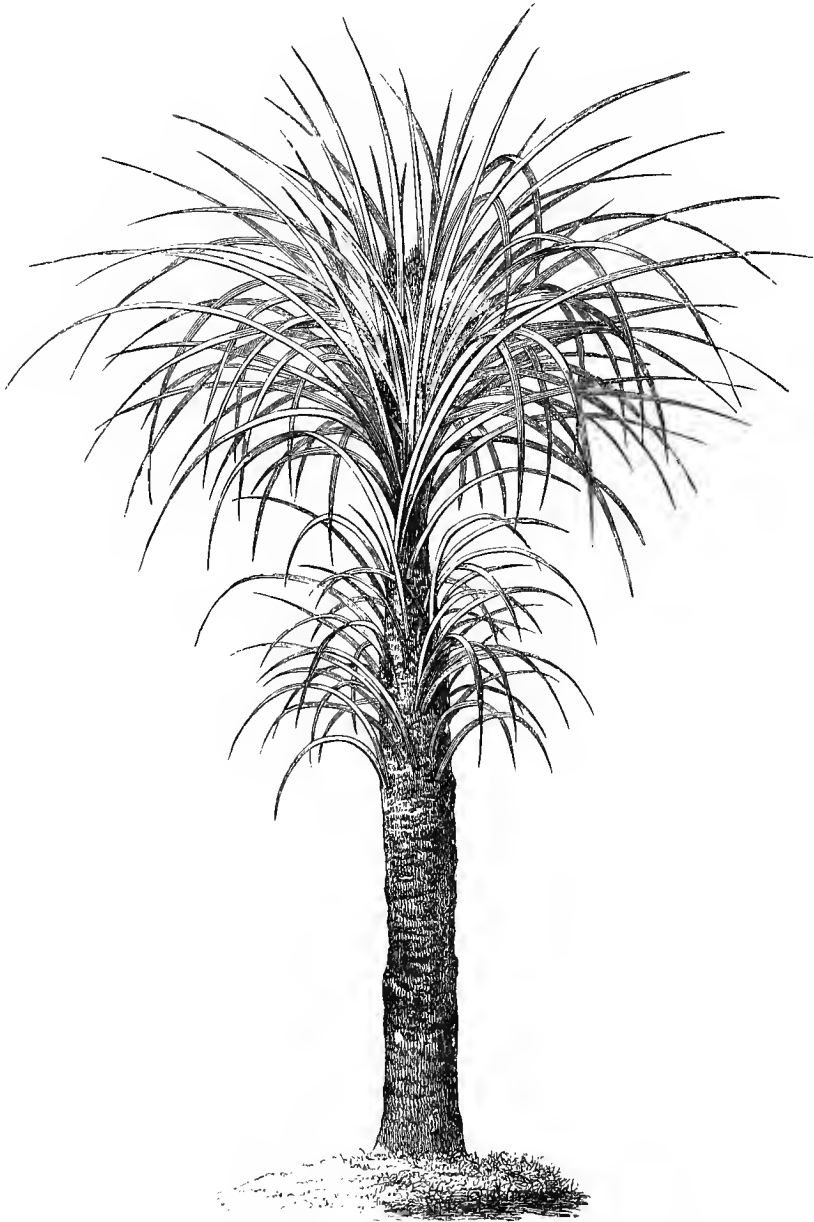


FIG. 154. VELLOZIA RETINERVIS.

Brazil. Flowers white, sulphur-coloured, violet, orange-red, or blue, often showy: perianth campanulate or funnel-shaped, with scarcely any tube, the segments equal and erecto-patent, ovate, oblong, or long-acuminate at

broadly linear, rigid, often sharp. The best-known species are here described. They thrive in a compost of well-drained, sandy peat, and must not be over-watered. Propagation may be effected by seeds, or by suckers.

**Vellozia**—continued.

**V. candida** (white). *fl.*, perianth pure white, very beautiful; stamens eighteen, in six bundles; peduncle elongated, above, as well as the ovary and perianth, scabrid-glandular. Summer. *l.* linear, grass-like, filiform-acuminate, rigidly keeled, remotely spinulose-serrate on the margins. Branches short, leafy at apex. Brazil, 1865. A very handsome, tufted, stove plant. (B. M. 5514.)

**V. elegans** (elegant). *fl.*, perianth pale lilac in bud, then pure white,  $\frac{1}{4}$  in. across, the segments spreading; peduncle terminal, sheathed at base, divided into three to five slender pedicels  $\frac{2}{3}$  in. to  $\frac{6}{10}$  in. long. May. *l.* tristichous, recurved,  $\frac{4}{10}$  in. to  $\frac{8}{10}$  in. long, linear-lanceolate, acuminate, sharply keeled, serrated towards the apex. Stem rigid, flexuous,  $\frac{6}{10}$  in. high. Natal, 1865. Greenhouse. (B. M. 5803.) SYN. *Talbotia elegans*.

**V. retinervis** (net-veined). *fl.*, perianth blue,  $\frac{1}{4}$  in. in diameter, the segments  $\frac{1}{4}$  in. to  $\frac{1}{2}$  in. long, three to four lines broad, naked outside; anthers  $\frac{1}{10}$  in. long, nearly sessile; peduncles dark-coloured above, with a few bristles below the oblong ovary, which is densely clothed with ascending, brown bristles. *l.* long-linear, recurved, rigid, glabrous. Trunk  $\frac{1}{2}$  ft. high, crowned with a tuft of leaves. Natal and Transvaal, 1877. Greenhouse. See Fig. 154. SYN. *Xerophyta retinervis* (G. C. n. s., vi., p. 837; R. G. 903).

**V. squamata** (scaly). *fl.*, perianth of a fine orange-red, the tube slightly enlarged upwards, the segments moderately spreading; scape longer than the leaves. Summer. *l.* terminal,  $\frac{4}{10}$  in. to  $\frac{6}{10}$  in. long, spreading, glaucous, linear, acuminate, keeled. Stem short, dichotomous, clothed with the scale-like remains of fallen leaves. Organ Mountains, 1841. Stove. SYN. *Barbacenia squamata* (B. M. 4136; P. M. B. xi. 75).

**VELLOZIEÆ.** A tribe of *Amaryllidææ*.

**VELTHEIMIA** (named in honour of Aug. Ferd., Count Veltheim, 1741-1801, a German supporter of botanical studies). ORD. *Liliacææ*. A small genus (three species) of greenhouse or half-hardy, bulbous plants, confined to South Africa. Flowers showy, densely clustered in a terminal spike or raceme, shortly pedicellate or sessile, pendulous or nodding; perianth tubular, cylindrical, equal or slightly enlarged above, persistent, the six lobes equal, very short, tooth-like; stamens six, equally affixed above the middle of the tube, included; scape simple, leafless; bracts scarious, short. Leaves radical, numerous, oblong or loriform, fleshy-herbaceous. The two species known to cultivation thrive in a light, loamy soil. Propagation may be readily effected by offsets; or leaves, pulled off close to the bulb, and inserted in pots of soil, will produce bulbs at their base.

**V. glauca** (glaucous). *fl.*, perianth red-spotted or yellowish,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long; pedicels scarcely above one line long; raceme  $\frac{2}{3}$  in. to  $\frac{6}{10}$  in. long,  $\frac{1}{4}$  in. to  $\frac{2}{3}$  in. thick; scape  $\frac{1}{2}$  ft. or more high; bracts linear, three to four lines long. March. *l.* narrower than in *V. viridifolia*, glaucous, much undulated. 1781. (B. M. 1091.) A variety *rubescens* (reddish-flowered) is figured in B. M. 3456.

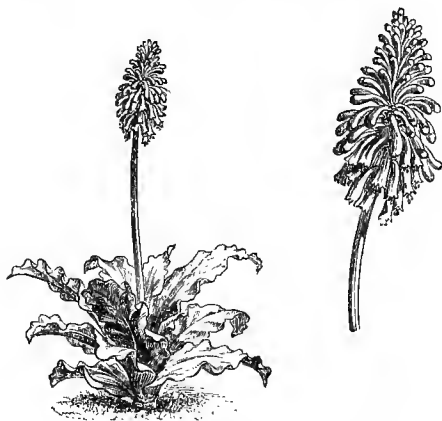


FIG. 155. VELTHEIMIA VIRIDIFOLIA, showing Habit and detached Raceme.

**V. viridifolia** (green-leaved). *fl.*, perianth reddish or yellowish, spotted,  $\frac{1}{4}$  in. to  $\frac{1}{2}$  in. long; pedicels two to three lines long;

**Veltheimia**—continued.

raceme  $\frac{3}{4}$  in. to  $\frac{4}{10}$  in. long,  $\frac{3}{10}$  in. thick, forty to sixty-flowered; scapes  $\frac{1}{2}$  ft. to  $\frac{1}{2}$  ft. long; bracts lanceolate, four to six lines long. August. *l.* ten to twelve, loriate,  $\frac{8}{10}$  in. to  $\frac{1}{2}$  in. long,  $\frac{2}{3}$  in. to  $\frac{3}{10}$  in. broad, green, the margins undulated. 1768. See Fig. 155. (L. B. C. 1245.) SYN. *Aietris capensis* (B. M. 501).

**VELUTINOUS.** Velvety; coated with soft, fine close, silky pubescence.

**VELVET FLOWER.** A common name for *Amaranthus caudatus* (which see).

**VELVET LEAF.** A common name for *Cissampelos Pareira* and *Lavatera arborea*.

**VENANA.** A synonym of *Brexia* (which see).

**VENATION.** The arrangement of veins.

**VENEER GRAFTING.** See *Grafting*.

**VENIDIUM** (no explanation of name given by its author). SYN. *Cleitria*. ORD. *Compositæ*. A genus comprising eighteen species of greenhouse or half-hardy, cano-tomentose or woolly, perennial herbs, confined to South Africa. Flower-heads rather large, on long peduncles; involucre bracts imbricated in many series; ray florets ligulate, entire or scarcely toothed. Leaves alternate, entire, sinuate-toothed, or pinnately dissected. For culture, see *Arctotis*.



FIG. 156. VENIDIUM CALENDULACEUM.

**V. calendulaceum** (Marigold-like). *fl.*-heads somewhat like those of the Pot Marigold; ray bright clear yellow; disk dark brown, nearly black. July to October. *l.* green, glabrous above, covered with a white-cottony felt beneath. *h.*  $\frac{6}{10}$  in. to  $\frac{1}{2}$  in. This is regarded, by Harvey and Sonder, as a variety of *V. decurrens*. See Fig. 156.

**VENOSE.** Veiny; having many branched veins.

**VENTENATIA** (of Smith). A synonym of *Stylidium* (which see).

**VENTILAGO** (from *ventilo*, to be exposed to the wind; alluding to the linear wings at the upper part of the fruit). ORD. *Rhamneæ*. A genus consisting of about ten species of stove, climbing shrubs, scattered over the tropics. Flowers small, in axillary and terminal (usually leafless) panicles, rarely in the axils; calyx with five spreading lobes; petals five, obtriangular or cucullate; stamens five. Leaves alternate, sub-bifarious. Only one species has been introduced. For culture, see *Berchemia*.

**V. madraspatana** (probably a native name). *fl.* green, in slender, simple or paniculate spikes. June. *l.*  $\frac{2}{3}$  in. to  $\frac{4}{10}$  in. long, oblong-lanceolate to ovate, acute or sub-acuminate, crenate or entire. Young branches (and leaves) glabrous or only slightly pubescent. India, 1822.

**VENTILATION.** Ventilation, or air-giving, is one of the most important operations in garden management, and the cultivation of all kinds of trees and plants under glass. Ventilators are requisite in all horticultural structures, for the purpose of regulating temperatures, and affording an interchange of air in their interiors. The amount of space made available for opening to admit air, depends on the kind of plants cultivated in any particular structure, as, for instance, conservatories and greenhouses. Peach houses and vineries need provision for the admission of an abundant circulation of air whenever it is required, or when circumstances and weather permit; while in plant stoves and houses in which the occupants need a more or less tropical atmosphere at all times, a smaller number of ventilators will suffice. It is always advisable to have some plan of giving Ventilation at, or near, the top: this is provided in most houses of modern construction, so that the least supply, or nearly the full amount, of air may be admitted without rain getting in, except from an occasional splashing. Ventilating gearing has been greatly improved during recent years, so that either top or bottom sashes along a house, say 30ft. long, may be easily opened or closed with one hand, working a lever, and the sashes may be fixed with the other hand to wherever they are required to remain. Where there are no side or front sashes, as in many lean-to houses, wooden door ventilators are best, fixed in the front wall; and if the air from these can be made to pass over the hot-water pipes, it will become warmed before reaching the plants. Wooden ventilators may be similarly placed in a back wall; but wherever convenient, lifting sashes are preferable.

There are numerous details attending the admission of air which depend on widely varied circumstances, and can only be learnt by practical experience; the state of the weather, which is often very changeable, and the difference between outside and inside temperatures, being, perhaps, the most important points to consider. At different seasons, too, the same plants will need very dissimilar treatment according to their stages of growth. During spring, the greatest care is necessary regarding the admission of air, as sudden changes of temperature, caused by improper Ventilation, quickly show their evil effects on young and tender foliage. In old-fashioned houses, with small panes of glass, the sun never has the same effect in raising the temperature inside, as in most of those of modern construction with large panes; hence the necessity of early attention to Ventilation becomes much greater with the last-named. Happily, many of the improved systems of applying air, as already referred to, afford the means of opening or closing the ventilators in a tenth part of the time occupied in handling each sash separately in a large house. In daily management, when it is known that air will have to be admitted to a house, the ventilators should be opened very gradually so soon as the temperature begins to rise in the morning or early part of the day. It is never good practice to allow the temperature to get high and then put on what air is required for the day at once, or even at twice. Under such management tender foliage often droops quickly because of a sudden change and excessive evaporation taking place. Few plants or trees are able to withstand this: their leaves often become scorched during the day, and the attacks of insects are much encouraged. In spring, the ventilating of forcing-houses and other structures may require somewhat different management nearly every day in order to keep near the requisite degree of heat. The quantity of air and the mode of applying it are, therefore, matters which must be determined in dealing with the culture of plants under such varied circumstances. What may be called general advice is to begin ventilating early, as already noted, when it is pretty certain that airing will be necessary,

#### Ventilation—continued.

and apply a little more at frequent intervals until sufficient for the day is put on. Secondly, draughts should always be avoided: if the air is cold or the wind rough, never open ventilators at the front and back parts of a house at the same time, unless the occupants are such as take no harm—and this is seldom the case. In summer, when the inside and outside temperatures are much more uniform than at other seasons, air may generally be most freely admitted without causing much injury.

**VENTRAL.** Belonging to the anterior or inner surface of a carpel; opposed to dorsal.

**VENTRICOSE.** Swelling unequally, or inflated on one side; e.g., the corolla of many labiate and personate plants.

**VENTRICULOSE.** Abounding with veinlets.

**VENUS' BASIN.** An old name for *Dipsacus sylvestris*.

**VENUS' FLY-TRAP.** See *Dionæa muscipula*.

**VENUS' GOLDEN APPLE.** A common name for *Atalantia monophylla* (which see).

**VENUS' HAIR.** A common name for *Adiantum Capillus-Veneris* (which see).

**VENUS' LOOKING-GLASS.** A popular name for *Specularia Speculum* (which see).

**VENUS' NAVELWORT.** See *Omphalodes liliifolia*.

**VENUS' OR VENICE SUMACH.** A common name for *Rhus Cotinus* (which see).

**VEPRIS.** Included under *Toddalia* (which see).

**VERATAXUS.** A synonym of *Taxus* (which see).

**VERATRUM** (the old Latin name, used by Læcretius and Pliny, from *vere*, truly, and *ater*, black; alluding to the colour of the root). False or White Hellebore. **ORD.** *Liliaceæ*. A genus embracing eight or nine species of hardy, perennial herbs, inhabiting Europe, Russian Asia, and North America. Flowers numerous in a terminal panicle, shortly pedicellate; perianth purplish, greenish, or whitish, persistent, broadly campanulate or explanate; segments (in hermaphrodite flowers) connate towards the base in a very short tube, in others oblong, spreading, subequal, scarcely contracted at base, many-nerved; stamens six. Leaves often broad, plicate-veined, contracted in an ample sheath, the upper ones rarely all narrow; floral ones bract-like. Stem erect, leafy. Rhizome thick (very poisonous), the root-fibres somewhat poisonous. The best-known species are here described. Gardeners make use of *V. album*, powdered, to destroy caterpillars. Veratums thrive in any rich soil. Propagation may be effected by divisions, or by seeds.

**V. album** (white)\*. Langwort; Lyngwort. *fl.*, perianth whitish within, greenish outside at base, spreading,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, the segments crisped-dentulate; pedicels very short or almost wanting; racemes dense, the rachis pubescent; panicle 1 ft. to 2 ft. long. July. *l.* rather firm, plicate, puberulous beneath; radical ones oblong, 1 ft. long,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. broad. Stem puberulous, with ten to twelve leaves, *h.*  $\frac{1}{2}$  ft. to 6 ft. Europe and Siberia, 1548. (F. D. 1120; J. F. A. 355.) The following, formerly classed as species, are regarded, by Baker, as mere varieties:

**V. a. Lobelianum** (Lobel's). *fl.*, perianth wholly greenish, the segments narrower than in the type; lateral racemes dense, erecto-patent. 1818.

**V. a. viride** (green). *fl.*, perianth greenish, the segments lanceolate, acute; lower pedicels two to three lines long; lateral racemes loose-flowered, often reflexed. North America, 1742. **SYN.** *Helonias viridis* (B. M. 1096).

**V. Maackii** (Maack's). *fl.*, perianth dark-purple,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, the segments oblong, blackish at base; lower pedicels three to four lines long; lateral racemes ascending; panicle very loose,  $\frac{1}{2}$  in. to 12 in. long. Summer. *l.*, lower ones lanceolate,  $\frac{1}{2}$  in. long,



**Veratrum**—continued.

lin. broad in the middle, distinctly petiolate; upper cauline ones sessile. Stem slender, 2ft. high, few-leaved, slightly thickened at base. Eastern Siberia, 1883. (R. G. 1070.)



FIG. 157. VERATRUM NIGRUM.

**V. nigrum** (black).\* *fl.*, perianth blackish-purple, two to three lines long, the segments oblong, obtuse; lower pedicels one to three lines long; racemes dense-flowered, the lateral ones short; panicle narrow, 1ft. to 3ft. long. June. *l.*, lower ones oblong,

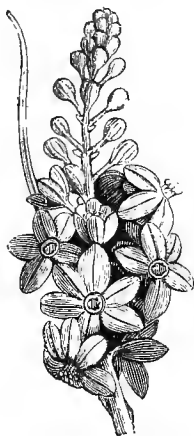


FIG. 158. PORTION OF INFLORESCENCE OF VERATRUM NIGRUM.

1ft. long, 6in. to 8in. broad, narrowed at base, plicate. Stem erect, 2ft. to 3ft. high, many-leaved, slightly bulbous at base. Central Europe, 1596. See Figs. 157 and 158. (B. M. 963; J. F. A. 339.)

**VERBASCUM.** A tribe of *Scrophularineæ*.

**VERBASCUM** (the old Latin name used by Pliny). Mullein. ORD. *Scrophularineæ*. A genus embracing nearly 100 species of mostly hardy, biennial herbs, rarely perennials or sub-shrubs, more or less tomentose or floccose-woolly, inhabiting Europe, North Africa, and West and Central Asia. Flowers yellow, fuscous, purple, or red, rarely white, on usually very short and ebracteolate pedicels, spicate or racemose; calyx deeply five-cleft or parted, rarely shortly five-toothed; corolla tube scarcely any, the lobes five, broad, nearly equal; stamens five, affixed at the base of the corolla. Leaves all alternate, often soft, entire,

**Verbascum**—continued.

FIG. 159. UPPER PORTION OF PLANT OF VERBASCUM PHENICEUM.

crenulate, sinuate-toothed, or pinnatifid. Few of the species are sufficiently beautiful to claim a place in our gardens. The British Flora embraces five species, *V. Blattaria*, *V. Lychnitis*, *V. nigrum*, *V. pulverulentum*, and *V. Thapsus*. A selection of the most desirable kinds is here given. With the exception of *V. nigrum* and *V. pinnatifidum*, which may be increased by divisions and cuttings respectively, all are hardy biennials, and only require sowing in any ordinary soil.

**V. bipinnatifidum** (bipinnatifid). A synonym of *V. pinnatifidum*.

**V. Blattaria** (Blattaria). Moth Mullein. *fl.* bright yellow, rarely cream-coloured,  $\frac{1}{2}$ in. to 1 $\frac{1}{2}$ in. in diameter; panicles slender, glandular; peduncles  $\frac{1}{2}$ in. to 1in. long. *l.*, radical ones 4in. to 10in. long, oblong-lanceolate, obtuse, crenate, lobulate, or sub-pinnatifid; cauline ones small, sessile, ovate or oblong, toothed or sub-crenate. Stem 8in. to 4ft. high, simple or branched. Europe (Britain). (Sy. En. B. 942.)

**V. Boerhaavii** (Boerhaave's). Annual Mullein. *fl.* yellow, sessile, fasciated or rarely solitary; corolla ample; raceme simple or rarely slightly branched. *l.* crenate, woolly; lower ones petiolate, obovate or oblong; upper ones cordate-amplexicaul, rarely very shortly sub-decurrent, acute or long-acuminate. *h.* 2ft. South Europe, 1731. A pretty species.

**Verbascum**—continued.

**V. Chaixii** (Chaix's). \* Nettle-leaved Mullein. *fl.* yellow; calyx segments lanceolate, subulate; fascicles loosely many-flowered; raceme paniculate. *l.* green or tomentose beneath, crenate; lower ones petiolate, cuneate at base, truncate or incised; upper ones sessile, rounded at base. *h.* 3ft. South and Central Europe, 1831.

**V. cupreum** (copper). A hybrid between *V. ovalifolium* and *V. phoeniceum*.

**V. ferrugineum** (rusty). A synonym of *V. phoeniceum*.

**V. formosum** (beautiful). A synonym of *V. ovalifolium*.

**V. Myconi** (Mycon's). A synonym of *Ramondia pyrenaica*.

**V. nigrum** (dark). Dark Mullein. *fl.* numerous within each bract, more or less stalked; corolla yellow, with bright purple hairs to the filaments. Summer and autumn. *l.* crenate, nearly glabrous on the upper side, slightly woolly beneath; lower ones large, cordate-oblong, on long stalks; upper ones nearly sessile, small, and pointed. Stem sparingly clothed with woolly hairs, 2ft. to 3ft. high, ending in a long, simply-branched raceme. Europe (Britain), Western Asia. A pretty perennial.

**V. olympicum** (Olympian). \* *fl.* bright golden-yellow, lin. to 1½ in. in diameter. *l.* rosulate, broad, lanceolate, acuminate, woolly. Stem 5ft. to 6ft. high, branched from near the base in a candelabra-like manner. Levant, 1833. Perennial. (R. G. 1078.)

**V. ovalifolium** (oval-leaved). *fl.* orange, large, solitary, disposed in a simple or dense spike; upper filaments orange or purple-woolly. *l.* ovate; lower ones doubly or incised-crenate; upper ones cordate-amplexicaul. *h.* 1ft. Tauria, 1804. (B. M. 1037.) SYN. *V. formosum* (B. R. 558). *V. cupreum* (B. M. 1226) is a hybrid between this species and *V. phoeniceum*.

**V. phlomoides** (Phlomis-like). Woolly Mullein. *fl.* yellow, fascicled; pedicels shorter than the calyx; racemes sub-solitary, elongated. *l.* crenulate, or the oblong radical ones doubly or sub-incised crenate; upper ones short, obtuse, or the intermediate ones somewhat angular-decurrent. *h.* 3ft. South Europe, 1739. (S. F. G. 224.)

**V. phoeniceum** (violet). \* *fl.* violet or red, rather large; pedicels solitary, remote, many times longer than the calyx; raceme glandular-pilose, simple or slightly branched. *l.* glabrous above, pubescent beneath; radical ones petiolate, ovate or oblong, entire or grossly crenate; cauline ones few, small. *h.* 3ft. South Europe, 1796. See Fig. 159. (B. M. 885; L. B. C. 637; R. G. 436, f. 2.) SYN. *V. ferrugineum* (A. B. R. 163).

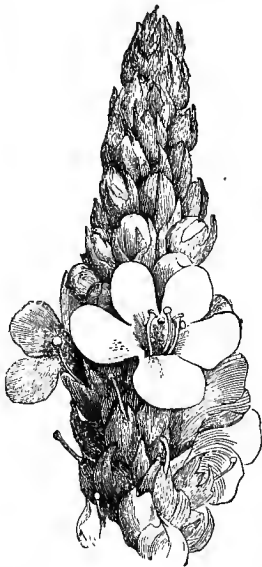


FIG. 160. PORTION OF INFLORESCENCE OF VERBASCUM THAPSUS.

**V. pinnatifidum** (pinnatifid). *fl.* yellow, in remote, few-flowered fascicles, sometimes sub-solitary; raceme slightly branched, rigid. *l.* mostly naked, green; radical ones bipinnatifid; cauline ones pinnatifid, with oblong, toothed segments; upper ones serrated or pinnatifid. Stems 1ft. or more high. Tauria, &c., 1813. Sub-shrub. (S. F. G. 228.) SYN. *V. bipinnatifidum* (B. M. 1777).

**V. pyramidatum** (pyramidal-flowered). *fl.* yellow; panicle pyramidal, caescent, 1ft. to 2ft. long, with short, bundle-flowered

**Verbascum**—continued.

branchlets (or, in gardens, an often elongated raceme). *l.* doubly crenate; lower ones ample, long-narrowed to the base; upper ones sessile, cordate-auriculate. *h.* 3ft. or more. Caucasus, 1804. A pretty species. (S. B. F. G. 31.)

**V. rubiginosum** (reddish-brown). *fl.* yellow and red; pedicels bi- or ternate, rarely solitary, twice or many times as long as the calyx; raceme loose, branched, sub-paniculate. *l.* pubescent beneath, crenate; lower ones petiolate; upper ones sessile or cordate-amplexicaul. *h.* 2ft. Hungary, 1817.

**V. r. tauricum** (Taurian). *fl.* larger, on shorter pedicels; raceme simpler. (B. M. 3799, under name of *V. tauricum*.)

**V. speciosum** (showy). *fl.* yellow; pedicels longer than the calyx; fascicles loose, often many-flowered; panicles very long, branched. *l.* thick, entire, or the lower ones crenate, oblong, elongated, long-narrowed into the petioles; upper ones sessile or cordate-amplexicaul. *h.* 6ft. Hungary, 1818.

**V. spectabile** (remarkable). *fl.* yellow and purple; pedicels solitary or few together; raceme elongated, nearly simple, viscous-villous. *l.* doubly crenate, glabrous or pilose above, slightly tomentose beneath; lower ones petiolate, oblong-ovate, cordate at base; upper ones sessile, semi-amplexicaul. *h.* 2ft. Tauria, 1820.

**V. Thapsus** (Thapsus in Africa). Aaron's Rod; Adam's Flannel; Blanket Leaf; Cow's Lungwort; Hag or Hig Taper; Jacob's Staff; Shepherd's Club; Torches, &c. *fl.* yellow; corolla ½ in. to 1 in. in diameter, woolly outside; spike 6 in. to 10 in. long, dense, simple. *l.* very decurrent; radical ones 6 in. to 8 in. long, obovate-lanceolate, entire or crenate; cauline ones oblong, acute, the upper acuminate. Stem 2ft. to 3ft. high, stout. Europe (Britain). See Fig. 160. (P. D. 631; Sy. En. B. 937.)

**VERBENA** (the old Latin name used by Virgil and Pliny). Vervain. ORD. *Verbenaceae*. A genus comprising about eighty species of greenhouse or hardy, annual or perennial herbs or sub-shrubs, almost wholly American. Flowers small or mediocre, solitary in the axile of the often narrow bracts; calyx tubular, five-ribbed, five-toothed; corolla tube straight or incurved, equal or slightly enlarged above; limb spreading, sub-bilabiate, the five lobes oblong or broad, obtuse or retuse; stamens four, didynamous, very rarely two, affixed above the middle of the tube, included; spikes terminal, rarely axillary. Leaves opposite, or rarely ternately whorled or alternate, toothed or often incised or dissected, rarely entire. *V. officinalis*, the British representative of the genus, was formerly held in great repute as a remedy for affections of the bladder, and its flowers were considered an instrument for restoring defective vision. Verbenas may readily be propagated by seeds, sown in heat, some time in early spring; or by cuttings of the young growths which have no flowers on them. The hardy species may also be increased by division of the rootstock. All require a rich soil, and may be planted in open borders during summer from the middle or end of May.

The best-known species are here described. Except where otherwise indicated, they are perennials, and flower in summer.

**V. alata** (winged). *fl.* rosy; spikes short, dense, sub-cylindric; panicle terminal, cymose, sub-fastigiate. *l.* sessile, ½ in. to 1 in. long, ovate or triangular-oblong, acute, entire or argutely serrated, three-nerved, wrinkled, strigose-scabrous. Stems sub-fastigiate. *h.* 4ft. Brazil, 1828. Half-hardy. (S. B. F. G. ser. ii. 41.)

**V. amona** (pleasing). *fl.* pinkish-purple; corolla lobes bifid; spikes long, dense, erect. *l.* stipulate, pinnatifid; lobes oblong, acute, clothed with closely-pressed pubescence; stipules much more hairy than the blade. Stems partially recumbent, covered with stiff, whitish hairs. *h.* 1ft. Mexico. Half-hardy. (P. M. B. vii. 3.)

**V. Aubletia** (Aublet's). Rose Vervain. *fl.* reddish-purple or lilac, rarely white; corolla limb ½ in. to ¾ in. broad; spikes pedunculate, elongated in fruit. *l.* 1 in. to 2 in. long, ovate or ovate-oblong, incisely lobed and toothed, often more deeply three-cleft, the truncate or broadly cuneate base tapering into a margined petiole. *h.* 1ft. or less. North America, 1774. Hardy. (B. M. 308; B. R. 294, var. 1925). *V. Lambertii* (B. M. 2200) is a form of this with narrower and more incised leaves. *V. l. rosea* (S. B. F. G. ser. ii. 363) has a light-coloured, fragrant corolla, ½ in. wide.

**V. bracteosa** (conspicuous-bracted). *fl.* purplish or blue, very small, exceeded by some of the leafy bracts; spikes thick, terminal. *l.* cuneate-oblong or cuneate-obovate, mostly narrowed into a short-margined petiole, pinnately incised or three-cleft, and coarsely-toothed. North America, 1820. Plant diffuse or decumbent, hirsute, annual or becoming perennial at base. Hardy. (B. M. 2910.)

**Verbena**—continued.

**V. chamædrifolia** (Chamædryis-leaved). *fl.* of a splendid scarlet colour, large and showy; spike solitary, on an elongated, ascending peduncle. *l.* oblong or ovate, broadly cuneate at base, crenate or somewhat incised-serrated, strigose above, hairy beneath, on short petioles. Stems filiform, fork-branched, creeping. Brazil, 1827. Half-hardy under-shrub. (B. 129; B. M. 3333; S. B. F. G. ser. ii. 9.) SYN. *V. melissoides*.

**V. c. Melindres** (vernacular name). *l.* oblong or oblong-lanceolate, unequally incised-serrated and less hairy. (P. M. B. i. 173; B. R. 1184 and L. B. C. 1514, under name of *V. Melindres*.)

**V. elegans** (elegant). *fl.* blue; corolla limb large, with emarginate lobes; spikes terminal, pedunculate, pyramidal. *l.* shortly petiolate, pinnatifid-laciniate, cuneate at base, slightly strigose-hispid; segments entire, linear-oblong, the margins slightly revolute. Stems branched, procumbent. Mexico, 1826. Hardy annual.

**V. erinoides** (Erinus-like). *fl.* reddish-violet; corolla shortly exerted; spikes terminal, pedunculate, solitary, elongated, fastigiate, caespitose-hairy. *l.* cuneate at base, decurrent, tripartite-pinnatifid or laciniate; laciniae lanceolate, slightly acute, entire or somewhat toothed, the margins slightly revolute. Stems hairy, much-branched, decumbent, rooting; branches ascending. Peru, 1818. Hardy annual. SYN. *V. multifida*.

**V. e. contracta** (contracted). *l.* tripartite; laciniae incised-pinnatifid; ultimate segments linear-oblong, acute. (B. R. 1766, under name of *V. multifida contracta*; S. B. F. G. ser. ii. 347, under name of *V. e. Sabini*.)

**V. hastata** (spear-shaped). Blue Vervain; Simpler's Joy; Wild Hyssop. *fl.* blue; spikes dense, strict, naked at base, or more or less pedunculate, numerous in a panicle. *l.* oblong-lanceolate, gradually acuminate, coarsely or incisely serrated, petiolate; some of the lower ones often hastately three-lobed at base. Stem erect, 3ft. to 6ft. high. North America, 1810. Hardy. *V. paniculata* (B. R. 1102) is a form wanting the three-lobed leaves.



FIG. 161. FLOWERING BRANCH OF VERBENA INCISA.

**V. incisa** (cut). *fl.* rosy-purple; calyx five lines long; spikes pedunculate, sub-ternate at the tips of the branches, corymbose-paniculate. *l.* lower ones oblong-triangular, cuneate, truncate or sub-cordate at base, attenuated into the petioles, pinnatifid-lobed, deeply incised-serrated, wrinkled; upper ones nearly lanceolate, sessile, incised-pinnatifid. Stem ascending; branches erect. *h.* 2ft. Brazil, 1826. Greenhouse sub-shrub. See Fig. 161. (B. M. 3628.)

**V. Lambertii** (Lambert's). A form of *V. Aubletia*.

**V. Melindres** (vernacular name). A variety of *V. chamædrifolia*.

**V. melissoides** (Melissa-like). A synonym of *V. chamædrifolia*.

**V. multifida** (much-cleft). A synonym of *V. erinoides*.

**V. mutabilis** (changeable). A synonym of *Stachytarpheta mutabilis*.

**Verbena**—continued.

**V. officinalis** (official). Common Vervain; Holy Herb; Juno's Tears; Pigeon's Grass; Simpler's Joy. *fl.* lilac,  $\frac{1}{2}$  in. in diameter; spikes dense-flowered, afterwards elongating. *l.* opposite, oblong, pinnatifid or tripartite, with acute or obtuse lobes; upper ones narrower. Stems 1ft. to 2ft. high, rigid, branched above. Europe (Britain). Plant hispid-pubescent. (F. D. 628; Sy. En. B. 1018.) SYN. *V. sororia* (S. B. F. G. 202).

**V. paniculata** (panicled). A form of *V. hastata*.

**V. phlogiflora** (flame-flowered). *fl.* purple or lilac (varying in cultivation to red and blue); corolla eight to nine lines long; spikes terminal, pedunculate, solitary or ternate, cymose-paniculate. *l.* oblong- or lanceolate-triangular, acute, cuneate at base, entire, long-attenuated into the petioles, incised-serrated, wrinkled, strigose above, hairy beneath, the margins slightly revolute. Stems ascending; branches erect. *h.*  $\frac{1}{2}$  ft. Brazil, 1834. Greenhouse sub-shrub.

**V. p. vulgaris** (common). *fl.* in solitary, terminal spikes. Stems slender, decumbent; branches much-spreading, diffuse, ascending-erect. (B. 60; B. M. 3541, P. M. B. iv. 5, and S. B. F. G. ii. 391, under name of *V. Tweediana*.)

**V. pulchella** (pretty). A synonym of *V. tenera*.

**V. radicans** (rooting). *fl.* lilac, fragrant; corolla twice as long as the pubescent calyx; spikes short, sub-capitate. *l.* trifid; segments mostly again trifid, the laciniae oblong-linear, slightly fleshy, highly glabrous. Stems procumbent, rooting. Andes, 1832. Greenhouse sub-shrub.

**V. rugosa** (wrinkled). A synonym of *V. venosa*.

**V. sororia** (sisterly). A synonym of *V. officinalis*.

**V. stricta** (straight). *fl.* blue; corolla four to five lines long; spikes comparatively thick, dense, caespitose, mostly sessile, or leafy-bracted at base. *l.* nearly sessile, ovate or oblong, very sharply and densely, mostly doubly serrated, rarely incised-cinereous with dense, soft, hirsute-villous pubescence, rugose-veiny. *h.* 1ft. to 2ft. North America. Hardy. (B. M. 1976.)

**V. sulphurea** (sulphur-coloured). *fl.* pale sulphur-coloured; corolla limb rather large; spikes pedunculate, capitate, many-flowered. *l.* pinnatifid-partite or nearly so, petiolate, strigose-hispidulous on both sides; laciniae much spreading, linear, obtuse, revolute. Stems procumbent; branches ascending or erect. *h.* about 2ft. Chili, 1832. Greenhouse, hairy sub-shrub. (B. R. 1748; S. B. F. G. ser. ii. 221.)

**V. tenera** (tender). *fl.* violet; corolla tube twice as long as the calyx; spikes terminal, pedunculate, solitary or ternate, fastigiate, at length elongated and relaxed, slightly caespitose. *l.* decurrent in short petioles, laciniate-pinnatifid; segments linear, slightly acute, entire, the margins somewhat revolute. Branches ascending. Brazil, 1827. A much-branched, creeping, greenhouse sub-shrub. SYN. *V. pulchella* (S. B. F. G. 295).

**V. t. Maonetti** (Maonette). *fl.* of a pleasing reddish-violet; corolla segments white-margined. (B. H. 1870, 6; F. d. S. 1129; R. G. 142, f. 1.)

**V. teucrioides** (Teucrium-like). *fl.* white or pinkish; calyx  $\frac{1}{2}$  in. long; corolla large, sweet-scented at night; spikes terminal, solitary, glandular-hairy. *l.* ovate or oblong-triangular, shortly cuneate at base, entire, shortly narrowed into the petioles, obtuse, somewhat sinuate-serrated, much wrinkled, the margins revolute, hairy above, tomentose beneath. Stems tufted, rooting at base, ascending, spreading-hairy. *h.* 2ft. Brazil, 1837. Greenhouse sub-shrub. (B. M. 3694; P. M. B. v. 243.)

**V. trifida** (trifid-leaved). *fl.* purple; spikes terminal, many, sub-sessile, short, very dense, clustered in a head. *l.* clustered, cuneate at base, sessile,  $\frac{1}{2}$  in. to 1 in. long, strigose-hispidulous, trifid or nearly so, emitting fasciculate-leafy branchlets from the axils; segments lanceolate, acuminate, the margins revolute. Branches tetragonal, and, as well as the spikes, hairy. *h.* 3ft. Mexico, 1818. A remarkable, greenhouse sub-shrub. (L. & P. F. G. i., p. 169.)

**V. triphylla** (three-leaved). A synonym of *Lippia citridora*.

**V. Tweediana** (Tweedie's). A synonym of *V. phlogiflora vulgaris*.

**V. venosa** (conspicuous-veined).\* *fl.* lilac or bluish; corolla tube slender, thrice as long as the calyx; terminal spikes sub-ternate, lateral ones pedunculate, fastigiate, at length cylindrical, imbricated. *l.* approximating, rigid, oblong, sub-cuneate, entire, semi-amplexicaul at base, adnate, acute, incised-serrated, spreading, unequal, the margins revolute, wrinkled and strigose above, hispidulous on the nerves beneath. Stems simple, ascending. *h.* 2ft. Brazil, 1830. A beautiful and well-known, half-hardy plant, very useful for bedding, particularly if mixed with a silver-leaved Pelargonium. (B. M. 3127; S. B. F. G. ser. ii. 207.) SYN. *V. rugosa* (S. B. F. G. ser. ii. 318).

**V. xutha** (yellow). *fl.* purple or blue, more crowded in the strict spikes and larger than in *V. officinalis*. *l.* incisely pinnatifid or laciniate, or some of the lower ones tripartite, more or less caespitose; lobes deeply toothed. *h.* 2ft. to 3ft. North America, 1824. Half-hardy.

*Garden Varieties.* Verbenas are amongst the most beautiful of summer bedding plants when they can be induced to succeed; but, unfortunately, of late years this

**Verbena**—*continued*.

has been an uncertainty, because of the plants being subject to, apparently, some kind of disease. For this reason, and also because stock plants are not, as a rule, easily preserved through the winter, many cultivators have taken to the raising of seedlings each spring for growing only through one summer. This is easily done, as the young plants grow rapidly and flower freely if the seed has been saved from a good source. Green Fly and Mildew are the greatest enemies to which the plants are subject; either of these, if allowed to remain on them, will soon work irreparable mischief. For exhibition purposes, Verbenas may be grown in pots in a cold frame. The following is a list of varieties that are best suited for bedding:

**BOULE DE NEIGE**, white, nicely scented. **CRIMSON KING**, crimson, with white eye; fine bedder. **LADY LONDESBOROUGH**, mauve, with white stripe. **LUSTROUS**, intense scarlet, with large, pure white eye; strong grower. **NEMESIS**, very deep pink. **PURPLE KING**, purple self; a good, well-known, old variety.

**VERBENACEÆ.** A natural order of herbs, shrubs, or trees, broadly dispersed over the warmer parts of the globe, and particularly abundant in South temperate regions. Flowers hermaphrodite or rarely, by abortion, polygamous, variously disposed; calyx inferior, persistent, the tube campanulate, tubular, or rarely almost obsolete, the teeth, lobes, or segments five, four, or rarely six to eight, or obsolete; corolla gamopetalous, the tube often incurved, the limb four or five-cleft, rarely multifid, the lobes equal or more or less bilabiate; perfect stamens four, didynamous, or two, or in a few genera as many as the corolla lobes; filamente inappendiculate; anthers two-celled; bracts variable, often small. Fruit more or less drupaceous or sub-capsular. Leaves generally opposite or whorled, entire, toothed, or incised-multifid, in one genus pinnate, in another digitately compound; stipules absent. Teak, one of the most important timbers in the world, is the wood of *Tectona grandis*. *Lippia citriodora*, and several species of *Lantana*, are used as tea. The order embraces fifty-nine genera, and nearly 700 species. Well-known examples are: *Clerodendron*, *Lantana*, *Verbena*, and *Vitex*.

**VERBENA, LEMON-SCENTED.** A common name for *Lippia citriodora* (which *see*).

**VERBENA OIL-PLANT.** A name given to *Andropogon Schenanthus* (which *see*).

**VERBENA, SAND.** A common name for *Abronia* (which *see*).

**VERBENA, SWEET-SCENTED.** *See* **Aloysia**.

**VERBESINA** (altered from *Verbena*, which some of the species are supposed to resemble). Crown Beard. Including *Platypteris* and *Ximenesia*. **ORD. Compositæ.** A genus comprising about fifty species of stove, greenhouse, or hardy, annual or perennial herbs, sub-shrubs, or rarely shrubs, inhabiting the warmer parts of America. Flower-heads yellow, or the ray florets white; involucre bracts oblong or linear, in few series; receptacle convex or conical, paleaceous; ray florets ligulate, spreading,



FIG. 162 VERBESINA PINNATIFIDA.

entire or two or three-toothed; achenes glabrous or pilose. Leaves opposite or the upper ones (or all) alternate, petiolate, sessile, or decurrent, toothed, lobed, or rarely entire. Few of the species possess any horticultural value. Those described below are, with the exception of *V. encelioides*, perennials. All thrive in rich soil, and may be increased by seeds, the perennials also by divisions.

**V. alata** (winged). *fl.*-heads sub-globose, solitary, terminal; ray florets orange-yellow, numerous, sub-biseriate. August. *l.* alternate, long-decurrent, oblong or obovate, obtuse, undulate and sinuate-toothed, nearly glabrous. Stem winged. *h.* 2ft. West Indies, &c., 1699. Stove. (B. M. 1716.)

**V. crocata** (yellow). *fl.*-heads orange-yellow, solitary, globose. Summer. *l.* opposite, decurrent, irregularly pinnately lobed;

**Verbesina**—continued.

lobes oval, erose-dentate, the terminal one somewhat deltoid. Branches four-winged. *h.* 2ft. Mexico, 1812. Stove. **SYNS.** *Platypteris crocata*, *Spilanthes crocata* (B. M. 1627).

**V. encelioides** (Encelia-like). *fl.*-heads yellow, disposed in a somewhat corymbose manner; achenes of the rays wingless, three-toothed, those of the disk winged, two-awned. August. *l.* ovate or oblong, coarsely serrated; petioles broadly winged, auricled at base. Stem erect, 2ft. to 3ft. high. Mexico, 1785. A caulescent, greenhouse annual. **SYN.** *Ximenesia encelioides*.

**V. pinnatifida** (pinnatifid-leaved). *fl.*-heads pale yellow; involucre scales blackish, linear-lanceolate, acute; rays about twelve, oblong; panicles opposite, branched, corymbose at apex. August. *l.* opposite, long-decurrent, pinnatifid, long-cuneate at base, hairy-puberulous on both sides, especially on the nerves. Stem four-winged, tomentose. *h.* 3ft. Mexico, 1825. Greenhouse. See Fig. 162.

**V. sativa** (cultivated). A synonym of *Veslingia sativa*.

**V. virginica** (Virginian). *fl.*-heads white, in compound corymbs; ray florets three or four, oval. August. *l.* alternate, ovate-lanceolate, feather-veined, toothed or lobed, decurrent, below, as well as the narrowly or interruptedly-winged stem, downy-pubescent. *h.* 2ft. North America, 1812. Hardy.

**VEREIA.** A synonym of **Kalanchoe** (which see).

**VERGE-CUTTER.** Another name for an edging-iron, a tool which is employed for cutting grass verges by the side of walks, flower-beds, &c., also for cutting out new beds in turf. The simple form with crescent-



FIG. 163. VERGE-CUTTER.

shaped blade (see Fig. 163) is the best, as it may be guided by the hand to cut in whatever direction is desired. It is unnecessary, as a rule, to use a Verge-cutter for the edges of walks more than once a year—spring is the best season—the shears being sufficient for the rest of the year. By the continued use of an edging-iron on both sides of a walk, the latter very soon becomes considerably widened.

**VERMICULAR.** Worm-shaped.

**VERMIFUGA.** A synonym of **Flaveria** (which see).

**VERNAL.** Appearing in spring.

**VERNAL GRASS.** The common name for **Anthoxanthum odoratum** (which see).

**VERNATION.** The disposition of the leaves within a leaf-hud.

**VERNICOSE.** Covered with natural varnish; appearing as if varnished.

**VERNONIA** (named in honour of William Vernon, a botanical traveller in North America). Ironweed. Including *Ascaricida* and *Webbia*. **ORD.** *Compositæ*. A vast genus (about 380 species) of stove, greenhouse, or hardy, annual or perennial herbs or shrubs, broadly distributed, chiefly

**Vernonia**—continued.

in the tropics, but most copiously in the warmer parts of America. Flower-heads purple, reddish, bluish, or rarely white, terminal, solitary, cymose, or paniculate, homogamous; involucre bracts in many series, the inner longest; receptacle naked or pitted, sometimes shortly hairy; florets all equal, tubular, slender, narrowly five-cleft; achenes striated, ribbed, or angled, rarely terete; pappus of many hairs, often girt with a row of outer short hairs or flattened bristles. Leaves alternate (or in one Brazilian species opposite), entire or toothed, pinnately veined, sessile or petiolate. Few of the species are known to cultivation, the majority being mere weeds. Those described below thrive in rich, light soil, and may be readily increased by seeds, cuttings, or divisions, according to the nature of the plant.

**V. acutifolia** (acute-leaved). *fl.*-heads pale purple, sub-sessile at the sides of the branches; involucre hemispherical; florets forty. December. *l.* sessile, linear, acuminate, reticulate-nerved, slightly serrated, glabrous above, obscurely pilose beneath. Stem erect, terete. *h.* 4ft. South America. Greenhouse perennial. (B. M. 3062.)

**V. axilliflora** (axillary-flowered). *fl.*-heads violet-purple, sessile, much shorter than the floral leaves; cymes long, scorpioid, terminal. September. *l.* shortly petiolate, oblong-elliptic, acute at both ends, nearly entire, scabrous and pilose above, villous-tomentose beneath. Branches terete, villous. *h.* 1½ft. Brazil. Stove shrub. (L. B. C. 1690.)

**V. Calvoana** (Calvo's). *fl.*-heads white, 2in. broad, with a purple eye; involucre scales large and spreading, in many series; corymbs large, branching and spreading, bearing leafy, toothed bracts. January. *l.* sessile, oblong-lanceolate, acuminate, 8in. to 14in. long, toothed, much narrowed and unequally auricled at base. Stem stout, sulcate, branched, tomentose-pubescent. *h.* 8ft. to 12ft. Cameroons, 1861. A magnificent, stove shrub. (B. M. 5698.)

**V. centriflora** (centre-flowered). A synonym of *V. scorpioides*.

**V. flexuosa** (flexuous). *fl.*-heads purple or white; involucre campanulate, the bracts mucronate-acuminate; cymes scorpioid. September. *l.* sessile, oblong or linear-lanceolate, nearly entire, scabrous-pilose on both sides. Stem herbaceous, from a tuberous rhizome. *h.* 1½ft. Brazil, 1823. Stove. (B. M. 2477; L. B. C. 1880.)

**V. noveboracensis** (New York). *fl.*-heads purple; involucre scales tipped with a long, bristle or awl-shaped, spreading appendage, in some varieties merely pointed. August. *l.* lanceolate or oblong. *h.* 5ft. North America, 1710. Hardy perennial.

**V. odoratissima** (highly odorous). *fl.*-heads purple; involucre scales acuminate; cymes disposed in a panicle. October. *l.* shortly petiolate, rigid, obovate, cuneate at base, slightly toothed at apex, scabrid above, reticulated and hirsute-pubescent beneath. Stem terete, shrubby. *h.* 4ft. Caraccas, 1817. Stove.

**V. pinifolia** (Pine-leaved). *fl.*-heads bright purple; involucre scales mucronate, caescent; corymbs 5in. to 8in. across, mostly compound, of many heads, flat-topped. Summer. *l.* sessile, crowded, linear, acute, 1in. to 4in. long, half to four lines wide, becoming glabrous above, the margins revolute. Stems 1ft. to 2ft. high, mostly closely leafy throughout. South Africa, 1863. Greenhouse perennial. **SYN.** *Webbia pinifolia* (B. M. 5412).

**V. scorpioides** (scorpioid-cymed). *fl.*-heads lilac-rose, sessile, contiguous; involucre scales hairy, the inner ones acuminate, the outer ovate; cymes scorpioid, recurved, leafless, approximate. Summer. *l.* petiolate, elliptic, acute, pubescent beneath. *h.* 1ft. Brazil and West Indies, 1874. Stove shrub. (R. H. 1874, 231.) **SYN.** *V. centriflora*.

**V. sericea** (silky). *fl.*-heads purple or white, sessile, solitary or twin in the axils; involucre campanulate, the outer scales recurved, mucronate, the inner ones obtuse. December. *l.* very shortly petiolate, lanceolate, acuminate, sub-obtuse at base, sub-entire, nearly glabrous above, adpressedly pubescent beneath. Stem terete, striated, very slightly puberulous. *h.* 4ft. Brazil, 1823. Stove sub-shrub. (B. R. 522.)

**VERONICA** (a mediæval name of doubtful derivation, probably from *hiera eicon*, sacred image; in allusion to the legend of the sacred handkerchief of S. Veronica). Cancerwort; Speedwell. Including *Diplophyllum* and *Leptandra*. **ORD.** *Scrophularinæ*. A genus comprising about 160 species of greenhouse or hardy herbs, shrubs, or rarely trees, broadly dispersed over temperate and frigid regions. Flowers often varying in colour in the same species, blue, purple, flesh-coloured, or white, disposed in bracteate, terminal or axillary racemes, rarely solitary in the axils of alternate leaves; calyx four, five, or very rarely three-parted, the segments scarcely imbricated; corolla tube rarely exceeding the calyx; limb spreading,

**Veronica**—continued.

four or five-cleft, the lateral lobes exterior (or one exterior), the upper and lower ones usually narrowest; stamens two, exserted; pedicels exchateolate. Leaves opposite, rarely whorled or somewhat scattered, the cauline ones very rarely alternate; floral ones always alternate, similar to the cauline ones or often reduced to bracts. Sixteen species are indigenous in Britain; among them the following may be mentioned: *V. Beccabunga* (Brooklime), with rather fleshy, blunt leaves, which are considered to be anti-scorbutic; *V. Chamædrys*, one of the loveliest of our wild flowers; and *V. spicata*, often grown in gardens. The best-known cultivated species are here described. Except where otherwise stated, they are hardy, and of perennial duration, thriving in any fairly good soil, and being increased by divisions. The shrubby kinds may be readily multiplied by cuttings, and the annuals by seeds.

**V. alpina** (alpine). *fl.* blue or violet; corolla two to three lines across; raceme spiciform or somewhat capitate, dense, or interrupted below. May. *l.* mostly shorter than the internodes of the simple stem ( $\frac{1}{2}$  in. to 1 in. long), ovate to oblong, crenulate-serrate or entire. *h.* 9 in. to 12 in. Europe (Britain), Asia, North America. (F. D. 16; Sy. En. B. 980.)

**V. a. Wormskioeldii** (Wormskioeld's). A villous-pubescent form, with larger leaves. 1819. (B. M. 2975.)

**V. amethystina** (amethystine-blue). A synonym of *V. paniculata*.

**V. amplexicaulis** (stem-clasping). *fl.* in short, conical, dense spikes  $\frac{1}{2}$  in. to 1 in. long, on hairy peduncles 1 in. to  $\frac{1}{2}$  in. long, crowded together near the ends of the branchlets; corolla white, the tube  $\frac{1}{2}$  in. long, the limb  $\frac{1}{2}$  in. across. *l.* loosely imbricated, amplexicaul or sub-amplexicaul, oblong, obtuse,  $\frac{1}{2}$  in. long,  $\frac{1}{2}$  in. broad, glaucous, coriaceous, entire, slightly concave. *h.* 1 ft. to 2 ft. New Zealand. Decumbent or sub-erect shrub.

**V. Andersonii** (Anderson's).\* *fl.* bluish-violet, sometimes whitish towards the base of the raceme; racemes shortly pedunculate, narrow-oblong, rather longer than the leaves. July. *l.* oblong,  $\frac{3}{16}$  in. to  $\frac{1}{4}$  in. long, somewhat obtuse, entire, puberulous on the margins, rather thick. *h.* 1 ft. Half-hardy shrub. Garden hybrid. (F. D. S. 658; L. J. F. 103; L. & P. F. G. 38.)

**V. a. variegata** (variegated). This differs from the type in having finely variegated leaves.

**V. anomala** (anomalous). *fl.* white, very shortly pedicellate or sessile; corolla tube  $\frac{1}{2}$  in. long, the limb  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. broad, the lobes nearly equal, three or two unequal, spreading, narrow; racemes crowded together, five to ten-flowered, sub-terminal. *l.* decussate,  $\frac{1}{2}$  in. to 1 in. long,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. wide, linear or linear-oblong, patent, often reddish-coloured, coriaceous, quite glabrous on the upper surface, sometimes ciliated on the margin, concave, entire, shortly petiolate. Branches long, slender, purplish or reddish towards the tips. *h.* 3 ft. to 6 ft. New Zealand. A dense-growing shrub.

**V. Buxbaumii** (Buxbaum's). *fl.* bright blue; corolla  $\frac{1}{2}$  in. across; peduncles solitary, axillary in alternate, leaf-like bracts. April to September. *l.* shortly petiolate, oblong or ovate-cordate,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, coarsely serrated; floral ones similar, shorter than the decurved pedicels. Branches 6 in. to 12 in. long. Europe (naturalised in Britain). A prostrate annual. (F. D. 1982; Sy. En. B. 973.)

**V. buxifolia** (Box-leaved). *fl.* white; corolla tube short, the limb  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. across; racemes very short, dense-flowered, crowded at the ends of the branches and sub-capitate, puberulous or glabrous; pedicels short; bracts as large as the sepals. *l.*  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. broad, broadly oblong-obovate, obtuse, suddenly truncate or cordate at the very short, thick petiole, excessively thick and coriaceous, concave. *h.* 2 ft. to 3 ft. New Zealand. A small, stout, glabrous shrub.

**V. carnosula** (slightly fleshy).\* *fl.* white, with reddish-yellow anthers; corolla tube very short, the limb  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. across; spikes short, pilose and pubescent, crowded and forming heads at the ends of the branches, very dense-flowered. Summer. *l.* closely imbricated, sub-erect,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, broadly obovate or oblong or orbicular, round at tip, entire, very thick and coriaceous, almost sessile or on broad petioles. New Zealand. A stout, often prostrate shrub.

**V. cataractæ** (waterfall). *fl.* white or pinkish,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. in diameter; pedicels very slender,  $\frac{1}{2}$  in. to 1 in. long; racemes axillary, slender,  $\frac{1}{2}$  in. to 8 in. long, very many flowered; bracts linear, subulate. *l.* sessile or petiolate,  $\frac{1}{2}$  in. to 5 in. long, ovate-oblong or narrow-lanceolate, acuminate, deeply and acutely serrate, coriaceous. Stems sub-erect or prostrate at the base and ascending, 10 in. to 2 ft. long, branched, rather slender. New Zealand. Shrub.

**V. caucasica** (Caucasian). *fl.* pale red; pedicels filiform; racemes loose, many-flowered, on slender peduncles. June. *l.* sub-sessile, once or twice pinnatisect; segments oblong or linear-cuneate, narrowed at base, entire or incised. Stems ascending or erect, pilose. Caucasus, 1816. (L. B. C. 1369.)

**V. Chamædrys** (Chamædrys). Angels' Eyes; Birds' Eyes; Ger-

**Veronica**—continued.

FIG. 164. FLOWERING BRANCHLET OF VERONICA CHAMÆDRYS.

mander Speedwell; God's Eye. *fl.* bright blue; corolla  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. across; raceme loose,  $\frac{1}{2}$  in. to 5 in. long, including the slender peduncle. May and June. *l.* all opposite, sub-sessile, ovate-cordate,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, deeply serrated. Branches 8 in. to 2 ft. long, slender, ascending. Europe (Britain). Plant hairy. See Fig. 164. (F. D. 448; L. B. C. 53; Sy. En. B. 986.)

**V. chathamica** (Chatham Island). *fl.* dark purple, large, numerous, closely set; peduncles  $\frac{1}{2}$  in. long, pubescent; racemes 1 in. to  $\frac{1}{2}$  in. long, sub-terminal at the ends of the branches and axillary to the uppermost leaves. *l.* spreading, sessile,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. broad, obovate-oblong or ovate-oblong, acuminate, entire, flat, scarcely coriaceous. Branches wiry, pubescent. Chatham Island. A small, prostrate, rambling shrub, adapted to the ornamentation of rockwork or earth-banks.

**V. Colensoi** (Colenso's). *fl.* white, pink, or bluish; corolla tube short, the limb  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. across; racemes sub-terminal, often compound, pedunculate, hardly longer than the leaves, puberulous. Summer. *l.* spreading or erecto-patent, almost sessile,  $\frac{1}{2}$  in. to 1 in. long, very coriaceous, linear-oblong or narrowly oblong-obovate, acute, entire, sometimes glaucous. New Zealand. A small, glabrous, half-hardy shrub.

**V. cupressoides** (Cypress-like). *fl.* violet,  $\frac{1}{2}$  in. in diameter, three or four at the end of the slender branchlets; bracts larger than the sepals, both broadly oblong, obtuse, not ciliated. *l.*  $\frac{1}{2}$  in. long, ovate-oblong, obtuse, not broader than the branch, opposite pairs connate at the base, erect or adpressed, glabrous, fleshy. New Zealand, Middle Island, &c. A dense, much-branched bush, 6 in. to 3 ft. or 4 ft. high. This is known in gardens under name of *V. salicornioides*.

**V. decussata** (decussate). A synonym of *V. elliptica*.

**V. Derwentia** (River Derwent). *fl.* light blue or white, rather crowded in racemes often 6 in. to 8 in. long, in the upper axils; corolla lobes broad, acute,  $\frac{1}{2}$  in. long, obscurely arranged in two lips. June. *l.* sessile, broadly lanceolate, acuminate,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, serrated. Stems 2 ft. to 3 ft. high. Australia. 1802. Greenhouse. (A. B. R. 551.) SYN. *V. labiata* (B. M. 1660, 3461).

**V. diosmaefolia** (Diosma-leaved). *fl.* lilac,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. across; pedicels slender; corymbs terminal, depressed, many-flowered. July. *l.* petiolate, close-set, spreading, rigidly coriaceous,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long,  $\frac{1}{2}$  in. broad, linear-oblong, acute at both ends, entire, not shining, sharply keeled by the midrib below. Branches rather slender. *h.* 3 ft. to 12 ft. New Zealand, 1835. Greenhouse shrub.

**V. elliptica** (elliptic).\* *fl.* white, large; corolla limb  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. broad; racemes very short, few-flowered, forming together a loose, sub-corymbose head at the tips of the branchlets. July. *l.* close-set, spreading, uniform, petiolate,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, linear or obovate-oblong, truncate at base, entire, flat, not shining. *h.* 5 ft. to 20 ft. New Zealand, Chili, Fuegia, and Falkland Islands, 1776. Half-hardy shrub or tree. (L. & P. F. G. iii. p. 101.) SYN. *V. decussata* (B. M. 242).

**V. epacridea** (Epacris-like). *fl.* white, collected into terminal, ovoid, leafy heads; corolla with a long tube, the limb  $\frac{1}{2}$  in. in diameter. *l.* sessile,  $\frac{1}{2}$  in. in diameter, densely imbricate, spreading and recurved,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, very broadly obovate-oblong, concave, rigid, glabrous, round or sub-acute at the tip. Stem much branched, rigid, tortuous. New Zealand. Half-hardy shrub.

**V. formosa** (beautiful). *fl.* pale blue, in short, loose racemes in the upper axils, forming terminal, leafy corymbs; corolla lobes  $\frac{1}{2}$  in. or more long. July. *l.* rather crowded, oval-oblong or lanceolate, entire or rarely obscurely toothed, thick, often recurved,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long. *h.* 2 ft. to 4 ft. Australia, 1835. A



**Veronica**—continued.

beautiful, corymbosely-branched, greenhouse shrub (B. M. 4512; L. J. F. 3; L. & P. F. G. 95.)

**V. gentianoides** (Gentian-like). *fl.* blue, rather large; pedicels at length  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long; racemes elongated, loose, many-flowered, pubescent. June. *l.* rather thick, entire or with a few crenatures, lin. to  $\frac{3}{4}$  in. long, the lower ones rosulate, obovate or oblong, the rest remote, oblong or lanceolate. Stems tufted, erect, simple,  $\frac{1}{2}$  in. to 12 in. or more high. Caucasus, 1748. (B. M. 1002; S. F. G. 5.) There is a very pretty variety, *alba*, with white flowers.

**V. glauco-cærulea** (glaucous-blue).\* *fl.* deep blue, changing to purple, in short, few-flowered spikes, crowded together near the tips of the branchlets; corolla limb  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in diameter; peduncles covered with soft, white hairs. *l.* closely imbricated,  $\frac{1}{2}$  in. long, obovate-oblong, acute, rather concave, on short, broad petioles. New Zealand. A small, stout, decumbent or sub-erect shrub, much branched, intensely glaucous throughout, with slightly hairy branches.

**V. Grievei** (Grieve's). A garden hybrid near *V. saxatilis*, resembling that species, but with brighter coloured-flowers. It is more suitable for flower borders.

**V. Guthrieana** (Guthrie's). A garden hybrid of which one of the parents is *V. saxatilis*.

**V. Hulkeana** (Hulke's).\* *fl.* lilac, sessile; corolla  $\frac{1}{2}$  in. broad; spikes spreading, puberulous and glandular, forming long, terminal, opposite-branched panicles,  $\frac{1}{2}$  in. to 10 in. long. Summer. *l.* in distant pairs, lin. to  $\frac{1}{2}$  in. long, oblong-ovate, obtuse or acute, coarsely serrated, rather coriaceous; petioles  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. Stem nearly simple, terete. *h.* 1 ft. to 3 ft. New Zealand, 1865. Half-hardy shrub. (B. M. 5484.)

**V. incana** (hoary).\* *fl.* blue; pedicels much shorter than the woolly calyx; racemes often solitary. July. *l.* petiolate, oblong or lanceolate, narrowed at base, the lower ones obtuse and crenate, the upper ones acute and serrated or entire at apex, both sides (as well as the stem) hoary-tomentose. *h.* 2 ft. Russia, 1759. SYN. *V. neglecta* (S. B. F. G. 55).



FIG. 165. VERONICA LONGIFOLIA SUBSEUSSILIS, showing Habit and single detached Flower.

**V. incisa** (cut-leaved). *fl.* blue, on pedicels rather longer than the calyx; racemes solitary or paniculate, slender. July. *l.* scattered, pinnatifid to the middle or rather deeper; lobes lanceolate, acute. Stems glabrous or canescent-pubescent. *h.* 2 ft. Siberia, 1739. (L. B. C. 1397.)

**V. Kirkii** (Kirk's). *fl.* pure white, shortly pedicellate, disposed in slender racemes in the axils of the uppermost leaves; corolla tube  $\frac{1}{2}$  in. long, the limb  $\frac{1}{2}$  in. in diameter; racemes  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, dense-flowered. *l.* lin. to  $\frac{1}{2}$  in. long by  $\frac{1}{2}$  in. wide, lanceolate, decussate or loosely imbricate, entire, smooth; acute, sessile by a broad base, slightly concave, recurved. *h.* 6 ft. to 12 ft. New Zealand. A tall, handsome shrub, with dark brown, polished branches.

**V. labiata** (lipped). A synonym of *V. Derwentia*.

**V. lævis** (smooth). *fl.* white,  $\frac{1}{2}$  in. across; racemes twice as long as the leaves, usually crowded at the ends of the branches,

**Veronica**—continued.

puberulous. *l.* erect and adpressed, imbricating, rarely spreading,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long,  $\frac{1}{2}$  in. broad, broadly obovate-oblong, obtuse or acute, extremely coriaceous, entire, concave, sharply keeled by the stout, prominent midrib; petioles short, very stout. *h.* 2 ft. to 4 ft. New Zealand. A glabrous shrub.

**V. latifolia** (broad-leaved). A form of *V. Teucrium*.

**V. ligustrifolia** (Ligustrum-leaved). *fl.* white, rather large; pedicels slender; racemes about twice as long as the leaves, rather slender, loose-flowered, puberulous. *l.*  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, usually very narrow, linear-lanceolate, acuminate,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. broad, flat or concave and keeled at the back, quite entire, sometimes  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. broad and obtuse. New Zealand. A large, glabrous, diffusely-branched, greenhouse shrub.

**V. Lindleyana** (Lindley's). A form of *V. salicifolia*.

**V. longifolia** (long-leaved). *fl.* lilac; pedicels often shorter than the calyx; racemes solitary or few, dense-flowered. August. *l.* shortly petiolate, opposite or ternately whorled, ovate or cordate at base, ovate- or oblong-lanceolate, acuminate, argutely serrated. Stems glabrous or puberulous. *h.* 2 ft. Central Europe, 1731.

**V. l. subseussilis** (nearly sessile). *fl.* of a beautiful amethystine blue; rachis of the raceme adpressedly-pubescent. *l.* very shortly petiolate,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, simply serrated, adpressedly puberulous beneath. *h.* 2 ft. to 4 ft. Japan, 1878. See Fig. 165. (B. M. 6407; G. C. n. s. xvi., p. 789; R. H. 1881, p. 270.)

**V. Lyallii** (Lyall's).\* *fl.* white, the veins pink near the throat; corolla nearly  $\frac{1}{2}$  in. across; pedicels slender, the lower ones  $\frac{1}{2}$  in. long; peduncles axillary, slender,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, glabrous, many-flowered. Summer. *l.* shortly petiolate,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, ovate to ovate-lanceolate, obtuse or acute, glabrous, with a few coarse serratures. Stems slender, prostrate and rooting, diffusely branched,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. New Zealand, 1879. Shrub. (B. M. 6456.)

**V. lycopodioides** (Lycopodium-like). *fl.* white, sessile, disposed in small, dense, oblong heads at the ends of the branches; sepals linear-oblong, obtuse, ciliated; corolla tube very short, the limb  $\frac{1}{2}$  in. in diameter. *l.* very densely and closely imbricated, thickly coriaceous, very broadly reniform-ovate, much broader than long, abruptly narrowed into an acute tip, about  $\frac{1}{2}$  in. broad; opposite pairs connate at the base. New Zealand. An erect, much-branched, stout shrub.

**V. multifida** (much-cleft). *fl.* light blue; pedicels scarcely exceeding the calyx; racemes dense-flowered. June. *l.* rarely more than  $\frac{1}{2}$  in. long, once or twice pinnatisect; segments linear or subulate, rarely oblong, narrowed at base. Stems decumbent or diffuse, woody at base, cano-pubescent,  $\frac{1}{2}$  in. long. Central and Eastern Asia, 1748. (B. M. 1673; J. F. A. 329.)

**V. neglecta** (neglected). A synonym of *V. incana*.

**V. officinalis** (official). Common Medicinal-tea Speedwell; Fluellen; Ground-hel. *fl.* pale blue or lilac, on very short pedicels; corolla  $\frac{1}{2}$  in. across; racemes slender, many-flowered. May to July. *l.* all opposite, shortly petiolate, obovate-oblong or orbicular,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, serrated. Stem hairy, decumbent; branches  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, ascending. Europe (Britain). (F. D. 248; Sy. En. B. 984-5.)

**V. orchidea** (Orchis-like). A form of *V. spicata*.

**V. orientalis** (Eastern). *fl.* flesh-coloured, small, and shortly pedicellate, or blue, larger, and longer-pedicellate; raceme loose. July. *l.* linear, lanceolate, or cuneate-oblong, entire, toothed, or with a few pinnatifid laciniae, narrowed at base. Stems decumbent or diffuse, woody at base, cano-pubescent or glabrous. Levant, 1748. (L. B. C. 419.) SYN. *V. taurica* (L. B. C. 911).

**V. paniculata** (panicled). *fl.* blue; pedicels longer than the calyx; racemes numerous, loose, many-flowered, paniculate. June. *l.* mostly opposite or ternately whorled, lanceolate, acute, crenate-serrate, narrowed at base, petiolate or rarely sub-sessile, rather thick, pale, glabrous or scarcely puberulous. Stems 1 ft. to 3 ft. high, glabrous or canescent-puberulous. South-Eastern Europe, 1797. SYN. *V. amethystina*.

**V. parviflora** (small-flowered). *fl.* blue, small; corolla  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. across; racemes generally straight, about twice as long as the leaves, dense-flowered, pubescent. May. *l.* erect or spreading, lin. to  $\frac{3}{4}$  in. long, lanceolate to linear-lanceolate, flat or concave and keeled, quite entire, acute or acuminate. *h.* 4 ft. to 6 ft. New Zealand, 1822. Half-hardy shrub. *V. p. angustifolia* (B. M. 5965) is a narrow-leaved form, with lilac flowers.

**V. pectinata** (comb-like). *fl.* blue; corolla ample; pedicels scarcely longer than the calyx; racemes at length as much as 1 ft. long. May. *l.* often small, obovate to oblong-linear, crenate or scarcely incised, narrowed at base. Stems prostrate, cano-pubescent or villous. Syria, &c., 1819.

**V. p. rubra** (red). A fine variety, with reddish-pink flowers.

**V. perfoliata** (perfoliate). Digger's Speedwell. *fl.* bluish-violet, streaked with purple, in long, slender racemes in the upper axils;

**Veronica**—continued.

corolla lobes nearly rotate, but obscurely bilabiate. Angust. *l.* amplexicaul and often more or less connate by their broad bases, ovate or ovate-lanceolate, acuminate or acute, entire or few-toothed, lin. to 3in. long. Stems simple or slightly branched. *h.* about 3ft. Australia. 1815. Greenhouse perennial or under-shrub. (B. M. 1936; B. R. 1930; L. B. C. 781.)

**V. pimeleoides** (Pimelea-like). *fl.* deep purple, opposite, in the axils of large, leafy, ciliated bracts; spikes short, very pubescent or tomentose, sub-distichous. *l.* sessile, imbricated, erectopatent, 3in. to 4in. long, broadly obovate-oblong, obtuse, rather concave, obtusely keeled, slightly glaucous. Branches erect, transversely scarred. *h.* 4in. to 10in. New Zealand. A sub-erect, greenhouse shrub.

**V. pinguifolia** (fat-leaved).\* *fl.* white; sepals obtuse, ciliated; spikes very short, pilose and pubescent, crowded in heads at the tips of the branches, very dense-flowered. June. *l.* sessile, imbricated, 3in. to 4in. long, obovate-oblong, obtuse, entire, very thick and coriaceous, concave, not keeled. Branches pubescent above, transversely scarred. *h.* 4in. to 4ft. New Zealand, 1870. An erect or decumbent, robust shrub. (B. M. 6147; B. M. 6587, under name of *V. carnosula*.)

**V. prostrata** (prostrate). A form of *V. Teucrium*.

**V. salicifolia** (Willow-leaved). *fl.* bluish-purple or white, very variable in size and length of corolla tube; pedicels slender; racemes much longer than the leaves, simple, very many flowered, pubescent or glabrate. June. *l.* sessile, 2in. to 6in. long, linear or oblong-lanceolate, acuminate, entire, glabrous. Branches terete, as thick as a crow-quill. New Zealand. A large, half-hardy, glabrous shrub. *V. Lindleyana* (P. M. B. xii. 247) is a form of this.

**V. salicornioides** (Salicornia-like). The plant grown under this name in English gardens is *V. cupressoides*; the true *V. salicornioides* has apparently not yet been introduced.

**V. satureioides** (Satureia-like). *fl.* blue; calyx unequally five-partite; corolla limb sub-bilabiate; raceme spicate, 3in. long. May. *l.* opposite, decussate, crowded, oblong or obovate, 3in. long; tip slightly toothed. Stems caespitose; base woody. *h.* 3in. Dalmatia, 1885. (R. G. 1192, fig. 3.)

**V. saxatilis** (rock-loving). Rock Speedwell. *fl.* bright blue, very beautiful. corolla 3in. across; raceme sub-corymbose, terminal, few-flowered. July to September. *l.* 3in. to 4in. long, the lower ones obovate, the upper oblong, coriaceous; teeth very few or none. Stem woody; branches many, 2in. to 4in. long, with leafy barren shoots. Europe (Britain). Plant decumbent. (L. B. C. 704; Sy. En. B. 981.)

**V. speciosa** (showy). *fl.* deep blue-purple; corolla 3in. broad; racemes dense-flowered, lin. in diameter, not longer than the leaves, stout, erect. May. *l.* sessile or on very short, thick petioles, 2in. to 4in. long, obovate-oblong, rounded at apex, very coriaceous, shining, entire, downy on the midrib above. Branches angled. *h.* 1½ft. New Zealand, 1835. Half-hardy shrub. (B. M. 4057; P. M. B. x. 247.)

**V. s. imperialis** (Imperial). A very handsome and free-flowering garden variety, producing its purple flowers in large, dense spikes. 1878. (F. d. S. 2317.)

**V. s. rubra** (red). This differs from the type in having rose-coloured flowers. (F. d. S. 196.)

**V. spicata** (spike-flowered).\* *fl.* bright blue; corolla tube shorter than the calyx; stamens very long, purple; spike dense, 1½in. to 3in. long. July and August. *l.* opposite or whorled, lin. to 1½in. long, sub-sessile, narrow-oblong or oblong-lanceolate, serrated above the middle. Stem 6in. to 18in. long, stout, erect from a decumbent base, leafy. Europe (Britain), &c. (F. D. 52; Sy. En. B. 982.) *V. orchidea* (B. M. 2210) is a form of this species, with narrow, tortuous corolla segments.

**V. syriaca** (Syrian). *fl.* blue; corolla rather large; pedicels filiform, several times longer than the calyx; racemes slender, bundle-flowered. June. *l.* lower ones petiolate, upper ones sessile, ovate or ovate-lanceolate, with a few incised teeth; lower floral ones somewhat conformed, the rest small, entire. Stems ascending or diffuse, branched. Syria, 1857. Half-hardy annual. (B. H. vii. 42; F. d. S. 1259.)

**V. taurica** (Taurian). A synonym of *V. orientalis*.

**V. Teucrium** (Teucrium). Hungarian or Saw-leaved Speedwell. *fl.* light blue; calyx segments very unequal; racemes many-flowered. July. *l.* sessile or the lower ones shortly petiolate, ovate to linear, rounded or cordate at base, more or less toothed or sub-pinnatifid. Sterile stems prostrate; floral ones ascending from a decumbent base, or erect, cano-pubescent or villous. South Europe, 1596. A variable species. (B. H. xxx. 7; L. B. C. 425.) There is a prostrate, small-leaved form

**Veronica**—continued.

with bright blue flowers. (B. M. 3683, under name of *V. prostrata*.)

**V. T. latifolia** (broad-leaved). A tall form, with broader leaves than the type. (S. B. F. G. 23, under name of *V. latifolia*.)

**V. Traversii** (Travers).\* *fl.* white; corolla lobes 3in. across; racemes longer than the leaves, sub-terminal, lin. to 2in. long, puberulous, many-flowered. Summer. *l.* spreading, sessile, 3in. to 1in. long, obovate or linear-oblong, acute or obtuse, entire, coriaceous, flat. Branches terete. *h.* 2½ft. New Zealand, 1873. Shrub. (B. M. 6390.)

**V. vernicosa** (varnished). *fl.* white; racemes crowded at the ends of the branches, puberulous, lin. to 1½in. long, often peduncled, tapering or caudate; bracts very small. *l.* close-set, spreading, petiolate, 3in. to 4in. long, 3in. to 4in. broad, obovate-oblong, obtuse or apiculate, varnished on the upper surface, entire, flat or a little concave. New Zealand. A small, stout, glabrous shrub.

**V. virginica** (Virginian).\* Culver's Physic; Great Virginian. Speedwell. *fl.* white, sometimes bluish; corolla salver-shaped; terminal spike 6in. to 10in. long, with usually several shorter ones from the upper axils. July. *l.* in whorls of three to nine, lanceolate, slenderly acuminate, sometimes oblong, very closely and sharply serrated, 3in. to 5in. long. Stems simple, 2ft. to 6ft. high. North America, 1714. (B. M. Pl. 196.) SYN. *Leptandra virginica*.

**VERRUCEFORM.** Shaped like a wart.

**VERRUCOSE.** Warted; covered with wart-like, sessile elevations.

**VERSATILE.** Turning freely on its support; swinging to and fro.

**VERSCHAFFELTIA** (named in honour of Ambrosius Verschaaffelt, who wrote a work on Camellias in 1848). SYN. *Regelia* (of gardens). ORD. *Palmæ*. A monotypic genus. The species is a handsome, stove Palm, requiring similar culture to *Stevensonia* (which see).

**V. melanochaetes** (black-spined). A synonym of *Roscheria melanochaetes*.



FIG. 166. VERSCHAFFELTIA SPLENDIDA.

**V. splendida** (splendid).\* *fl.* spathes three; spadix 3ft. to 6ft. long, on a compressed peduncle 3ft. to 4ft. long; flowering branches 7in. to 8in. long. *l.* 4ft. to 7ft. long, 3ft. to 5ft. broad, cuneate-obovate, bright green, bifid, the edges deeply incised,

**Verschaffeltia**—continued.

the primary veins prominent on both surfaces; petioles 6 in. to 12 in. long, pale green, semi-terete, grooved down the face; sheaths 2½ ft. to 3½ ft. long, white-granular. Stem 6 in. to 12 in. in diameter, and (as well as the leaf-sheaths and petioles) very spiny when young. *h.* 80 ft. Seychelles, 1864. See Fig. 156. (F. d. S. 1597-8; I. H. 430; R. G. 1875, p. 308; R. H. 1869, 148.) This has been known in gardens as *Regelia magnifica*, *R. majestica*, and *R. princeps*.

**VERTEBRATE.** Contracted at intervals, like the vertebrae of animals, there being an articulation at each contraction, as in some leaves.

**VERTEX.** The apex of an organ.

**VERTICAL.** Placed in the direction from base to apex.

**VERTICIL.** A whorl.

**VERTICILLASTER.** A false whorl, composed, in *Labiata*, of a pair of opposite cymes.

**VERTICILLATE.** Disposed in a whorl; when several bodies form a ring round a common axis: e.g., leaves round a stem; sepals, petals, and stamens round an ovary.

**VERTICORDIA** (from *verto*, to turn, and *cor*, cordis, a heart; a title of Venus, to whom the Myrtle was sacred). Juniper Myrtle. Including *Chrysorrhoe*. ORD. *Myrtaceæ*. A genus embracing thirty-seven species of greenhouse shrubs, with usually the aspect of a Heath or Diosma, glabrous except the cilia on the edges of the leaves, limited to Australia. Flowers whitish, pink, or yellow, usually pedicellate in the upper axils, often corymbose, spicate, or racemose; calyx lobes five, often coloured, elegantly plumose, radiating; petals five, entire, fringed, or digitate; stamens ten, alternating with as many staminodia. Leaves small, opposite or very rarely alternate, entire. A selection of the introduced species is here given. They are of easy culture in a compost of sandy loam and leaf mould. They are readily propagated by cuttings of firm or partially-ripened shoots, inserted under a glass, or in a close frame. An abundance of water and frequent syringings are requisite throughout the summer. The roots should not be allowed to get quite dry at any time.

**V. Brownii** (R. Brown's). *fl.* white, small, very numerous, in dense, broad, terminal, leafy corymbs, more or less pedunculate; petals shorter than the calyx lobes. April. *l.* obovate or oblong, very obtuse, keeled or triquetrous, ½ in. to ¾ in. long. *h.* 3 ft. 1842. Shrub erect, bushy, and much branched.

**V. densiflora** (dense-flowered). *fl.* white or pink, in dense, terminal, leafy corymbs, usually pedunculate; petals short, nearly orbicular, fringed. June. *l.* linear, semi-terete or triquetrous, slender, ½ in. to ¾ in. long, crowded on the short side branches so as to form axillary tufts as in *V. Fontanesii*, but usually more remote on the main stems. *h.* 2 ft. to 3 ft. 1860. Shrub erect and bushy.

**V. Fontanesii** (Desfontaines'). *fl.* white or pink, in terminal, leafy corymbs, or rounded, dense panicles, close above the stem leaves or shortly pedunculate; petals as long as the calyx lobes, slightly pubescent. April. *l.* linear, semi-terete or triquetrous, usually slender, obtuse or mucronate, three to four lines long, densely crowded on the short lateral shoots, or rarely ½ in. long and looser. *h.* 3 ft. to 4 ft. 1826. Shrub erect and bushy. SYN. *Chamaelancium plumosum*.

**V. insignis** (remarkable). *fl.* pink, on pedicels often more than lin. long, in loose, irregular, terminal, leafy corymbs; petals orbicular, ciliated. April. *l.* broadly ovate to oblong, very obtuse or almost mucronate, two to four lines long, the lower ones, and those of the barren branches, often laterally compressed or vertical. *h.* 1 ft. to 2 ft. 1839. Shrub erect, branching from the base.

**V. nitens** (shining). *fl.* golden-yellow, on slender pedicels, in a broad, terminal corymb; petals about as long as the calyx, irregularly toothed. April. *l.* linear, semi-terete, rather slender, acute or mucronulate, mostly ½ in. to ¾ in., but the lower ones sometimes above lin. long. *h.* 2 ft. 1862. Shrub corymbosely branched. (B. M. 5285.) SYN. *Chrysorrhoe nitens*.

**VERULAMIA.** A synonym of *Pavetta* (which see).

**VERVAIN.** See *Verbena*.

**VERVAIN, BASTARD.** See *Stachytarpheta*.

**VERVAIN SAGE.** See *Salvia Verbenaca*.

**VESICARIA** (from *vesica*, a bladder or blister; alluding to the inflated pods). Bladder Pod or Seed. ORD. *Cruciferae*. A genus embracing about a score species of mostly hardy, branched, annual or perennial herbs, found in temperate North America, South Europe, Syria, Persia, and the Andes. Flowers yellow or purple, variable in form, large, rarely small; sepals equal at base, or the lateral ones sub-saccate; racemes ebracteate. Pods globose or inflated. Leaves entire, sinuate, or pinnatifid. The species here described are well adapted for ornamenting rockwork. They are of the simplest culture. The annuals may be increased by seeds, and the perennials by divisions.

**V. arctica** (Arctic). *fl.* yellow, many in dense racemes. August. *l.* oblanceolate and linear-spathulate, of a beautiful silvery colour, clustered. *h.* 1 ft. North America, 1828. Perennial. (B. M. 2882.)

**V. gracilis** (slender). *fl.* yellow; petals spreading, obcordate, nearly sessile; racemes elongated. June. *l.* lanceolate, entire or slightly angular, nearly naked; lower ones sub-spathulate, petiolate. Stems many, filiform, rigid, slightly scabrid. *h.* 6 in. Texas, 1834. Annual. (B. M. 3535.)

**V. græca** (Greek). *fl.*, petals nearly twice as long as the calyx, the lamina yellow, elliptic. Summer. *l.* of the sterile branches thick, oblong-spathulate, slightly acute; those of the fertile stems sessile, erect, acute, the margins ciliated and often denticulate. Greece. Perennial. SYN. *Alyssum utriculatum*.

**V. grandiflora** (large-flowered).\* *fl.* yellow, large; petals rounded, spreading, very shortly clawed; racemes elongated, many-flowered. July. *l.* oblong; radical ones sub-lirately pinnatifid, petiolate; cauline ones sinuate-toothed, sessile. Stem erect, flexuous. *h.* 1 ft. Texas, 1835. A stellately-pubescent annual. (B. M. 3464; S. B. F. G. ser. ii. 401.)



FIG. 167. *VESICARIA UTRICULATA*, showing Habit and detached Flower.

**V. utriculata** (bladder-podded).\* *fl.* yellow, closely resembling the Wallflower; calyx bisaccate at base. April to June. *l.* oblong, quite entire, smooth; lower ones ciliated, somewhat spathulate. *h.* 1 ft. South Europe, 1730. Perennial. See Fig. 167. (S. F. G. 627.)

**VESICLE.** A small bladder or air cavity.

**VESICULAR, VESICULATE, VESICULOSE, VESICULIFORM.** Inflated; bladdery; appearing as if composed of little bladders.

**VESLINGIA** (named after John Vesling, 1598-1649, a traveller in the East, and Professor of Botany at Padua). SYNS. *Guizotia* (the proper name, according to Bentham and Hooker), *Rantilla*. ORD. *Compositæ*. A small genus (three species) of tropical African, stove, annual herbs. Flower-heads yellow, at the tips of the branches or pedunculate in the upper axils, heterogamous;

**Veslingia**—*continued*.

involucral bracts somewhat biseriate; receptacle convex or conical; ray florets ligulate, three-toothed at apex; achenes glabrous. Leaves opposite or the upper ones alternate, entire or toothed. Only one species calls for description here. It thrives in any rich soil, and may be increased by seeds.

**V. sativa** (cultivated). *fl.* heads golden-yellow, 2in. across, rather handsome; involucre simple, of five leaflets. August and September. *l.* amplexicaul, cordate-lanceolate, remotely serrated. *h.* 6ft. 1806. SYN. *Verbesina sativa*. (B. M. 1017.) *Guizotia oleifera* is now the correct name of this plant.

**VESPA**. See Wasps.

**VESPERTINE**. Appearing or expanding in early evening.

**VESPUCCIA** (commemorative, in honour of Amerigo Vespucci, 1451-1512, after whom America is named). *Hydrocleis* is now the correct name of this genus. ORD. *Alismaceæ*. A small genus (three or four species) of highly glabrous, stove, aquatic herbs, inhabiting tropical South America. Flowers solitary, large, hermaphrodite, on long, thick peduncles; perianth segments six, the three outer ones (sepals) persistent, the three inner ones (petals) yellow, larger, very slender, deciduous; stamens numerous, hypogynous, in many series. Leaves fascicled, floating, ovate- or cordate-orbicular, the nerves converging at the apex; petioles thick, sheathing at base. *V. Humboldtii*, the only species calling for description here, is of easy culture in a tub or cistern of water. It may be readily increased by seeds, or by runners.

**V. Humboldtii** (Humboldt's). *fl.*, sepals narrow-ovate, obtuse; petals broadly obovate-cuneate, ample; stamens numerous, fertile or sterile; peduncles springing from the nodes, one-flowered. May. *l.* both radical and cauline ones broadly ovate or sub-orbicular, obtuse, loosely cordate at base, 2in. to 3½in. long, 1½in. to 2½in. broad, coriaceous; petioles terete, 4in. to 6in. long. Venezuela to Buenos Ayres. SYN. *Limncharis Humboldtii* (B. M. 3248; B. R. 1640). *Hydrocleis Commersonii* is now the correct name of this plant.

**VESSELS**. In the vascular system of vascular plants (i.e., the flowering plants and higher Cryptogams), Vessels are found plentifully; but they do not occur in any groups of plants lower than the Ferns and their allies, though the laticiferous cells of a few Fungi are a good deal like them in appearance.

Vessels may be grouped as follows: 1. True Vessels, being those of the fibro-vascular bundles, which compose the vascular system. These comprise (a) Vessels of the Wood ("xylem") and (b) Vessels of the Bast ("phloem"), or sieve-tubes. 2. Vessels of the Cellular Tissue, or Ground Tissue, scattered through the pith and cortex of the roots and stems, and among the green cells of leaves. These three classes of Vessels differ materially in their nature, contents, and uses. The two classes of true Vessels agree in being present in all complete fibro-vascular bundles; and also in being always formed by the absorption of the walls that separate elongated cells placed in rows, either end to end, or overlapping more or less at the tapering ends, so that tubes are thus formed of indefinite length. In most Vessels it is easy to trace the cells of which they are formed by the marks that remain on the walls where the cells meet. The Vessels of the Wood differ from those of the Bast in several important respects. But before stating these it may help to elucidate the subject if a brief account of the ordinary structure of fibro-vascular bundles is given.

We shall select for description such a bundle as may be found in the stems of many Monocotyledons. In these plants the bundles usually remain separated from one another, during their whole existence, by the cellular tissue in which they are imbedded; and after they are once formed they do not undergo changes, so that the arrangement of the cells and Vessels of which they are built up is little, if at all, altered during growth. The simplest bundles of this kind consist of a group of the Vessels

**Vessels**—*continued*.

of the Wood (called "tracheæ"), united with a group of Vessels of the Bast ("sieve-tubes"); but in most parts of plants these are accompanied by cells, some of which are elongated and slender (fibre-cells or "prosenchyma") while others are little, if any, longer than broad ("parenchyma"). Some of the cells usually remain thin-walled; but others have the walls much thickened by deposits upon the inner surface, and then the tissue is called "sclerenchyma." This tissue adds to the strength of the bundle, being arranged alongside the Vessels (as wood-fibres or hard-bast fibres), or forming a sheath surrounding the bundle entirely or in part. The commonest position of the wood and bast of each bundle, as seen in transverse section, is that in which the wood lies nearer the centre of the stem, and the bast nearer the circumference; but in some plants there is bast inside, but not outside, of the wood, or there may be bast both inside and outside, or even all round the wood. Less often the bast lies in the middle, with the wood all round it. The arrangements in leaves correspond with those in stems. If the leaf is held erect, with the upper surface next the stem, that surface is nearer the centre of the stem, and the lower surface is further from it. In accordance with this, the Wood-vessels of each bundle are usually nearer the upper surface, and the bast nearer the lower surface of the leaf. In roots the earliest bundles to appear (called the primary wood-bundles), consist entirely of Wood-vessels, which are formed successively nearer and nearer the centre of the root, increasing in size as they come nearer to the centre. Between them, and at the same distance from the centre as they are, the bast is formed; hence, the root is markedly different from the stem in the arrangements of the bundles. In the stems and roots of Monocotyledons, the bundles early assume the appearance and structure that they permanently retain; but in woody Dicotyledons and Conifers, changes occur after the first year of growth, which greatly affect their original appearance. In each bundle in the stem, the wood and the bast are separated by a layer of thin-walled cells (the "cambium") which continues to form new cells by divisions parallel to its surfaces, producing new wood to the outside of the older wood, and new bast to the inside of the older bast. The cambium forms a complete cylinder around the wood of the stems of these plants, and gives origin to ring above ring of wood, usually one in each year of growth. The bundles grow so large that they are separated only by narrow belts of cells (medullary rays), the oldest of which runs from the pith in the centre to the cortex outside the bast; while the new rays formed each year run from the inner border of the ring of wood to the cortex. The fibro-vascular bundles can scarcely be separated, after a time, from one another; but the wood and the bast are easily disunited in most Dicotyledons at the cambium, as the cells of this ring readily give way, and the bark is thus easily separable from the wood. The bast forms the innermost layer of the bark, and its connection with the wood tends to become less evident than it was before the bundles were united by the continuous cambium.

In the roots of Dicotyledons and Conifers, the earliest-formed wood-bundles do not grow; but there is a layer of cambium to the inside of each bast bundle, and soon this layer begins to form wood from its inner surface, and bast from its outer. After a short time, the cambium forms a continuous layer like that in the stem, and the roots in cross-sections look much like stems, except that the pith in the centre is often small or wanting, and that a practised eye can usually detect the primary wood-bundles lying close to the centre, and free from the bundles formed by the cambium.

We must now pass to the various kinds of Vessels met with in the wood and the bast. In the wood of all

**Vessels—continued.**

bundles there are "spiral" or "annular" Vessels. These are long, slender tubes, which appear round in transverse section. They frequently show very slight traces of the cells of which they were built up. The characteristic feature in them is the existence of a peculiar thickening deposit in the vessel, which, in a longitudinal section of the bundle, is not unlike a glass tube inclosing a closely-wound spiral wire, or wire rings; or a more familiar comparison may be made with an indiarubber tube, kept open by a wire spirally coiled in its interior. Besides spiral and annular Vessels, the wood-bundles very generally contain others, in which the thickening deposits are laid down on the inner surface of the walls in the form of a more or less regular network ("reticulated Vessels"), or of the steps of a ladder ("scalariform Vessels" of Ferns and their allies), or covering the wall, so as to leave only narrow tubes or pits through the new layers ("pitted or dotted Vessels," or "Ducts"). All these Vessels show an angular form in transverse section; and they are generally wider than the spiral Vessels. They also show distinctly the boundaries of the cells of which they are built up; though the openings from cell to cell are always relatively large. Spiral and annular Vessels are very rarely formed by the cambium; hence, in Dicotyledons and in Conifers, they are present in the stems and roots usually only in the earliest-formed wood—i.e., they surround the pith; and, at one period, they were supposed to form around the pith a peculiar organ, which was called the "medullary sheath." In Dicotyledons, the Vessels in the wood formed by the cambium are almost all reticulated, dotted, or pitted. In Conifers, very few Vessels are formed by the cambium, their work being done by wood-cells, with openings from one to the other of a peculiar nature. All the characteristic Vessels of the Wood very soon lose their protoplasm, and contain only air or sap, or, more generally, both air and sap. The walls of fully-formed Wood-vessels are lignified and firm.

The Vessels of the Bast are very distinct from those of the wood. They are always present in the soft bast (though not always easily detected, except by an expert microscopist); but a few may also be found in some plants in the pith or the cortex. They assume the form of slender tubes, with thin, flexible walls, unmarked by thickening deposits. The walls separating the cells that make up these Vessels are not entirely absorbed (as is the case in the Wood-vessels). They can always be recognised as cross-partitions; but they are pierced by numerous small openings, so as to resemble a sieve, whence they are called "sieve-plates," and the Vessels are called "sieve-tubes." Often, the side walls of adjoining tubes also show sieve-plates. The sieve-tubes retain their protoplasmic contents; and the protoplasm extends through the sieve-plates. Sachs believes that the new protoplasm is largely produced in the sieve-tubes; and there is no doubt that they are the channels by which the protoplasm is chiefly, if not entirely, carried from one part of a plant to another, as may be required during growth.

The Vessels of the ground-tissue are of far less general occurrence than those of the vascular system; and they are very different from these in their nature, if we except the small, scattered bundles of sieve-tubes that traverse the ground-tissues of certain plants. The only form of ground-tissue Vessels that calls for special mention is that containing "latex," from which the Vessels themselves are called "Laticiferous Vessels." They exist only in certain orders of plants, chiefly among Dicotyledons, e.g., *Campanulaceæ*, many *Compositæ*, *Euphorbiaceæ*, *Ficoideæ*, *Papaveraceæ*. Among Monocotyledons, they can scarcely be said to exist in their characteristic form, or with their characteristic contents. Laticiferous Vessels vary in their mode of origin in different plants. In most (e.g., Poppies, Dande-

**Vessels—continued.**

lion), they are formed, like other Vessels, by the union of cells, of which the dividing-walls are entirely or partially absorbed. Thus very irregular Vessels are formed, which unite freely with one another by branches, so as to form a copious network, with free inter-communication. The walls of these Vessels seldom show thickening deposits. In a few orders (*Asclepiadeæ*, *Euphorbiaceæ*), the Laticiferous Vessels are probably formed, not by the union of cells, but by the elongation and branching of cells, which are not divided by cross-partitions, and which thus reach a very great length. It is believed, by many botanists, that the Laticiferous Vessels of some plants (e.g., *Rhus*) are really intercellular spaces, into which the latex is poured. The Laticiferous Vessels frequently accompany the sieve-tubes, and may even take their place to some extent. In those Monocotyledons that possess latex, it is contained in rows of large cells, separated by walls, in which perforations have not been clearly made out (*Allium Cepa*); or, in those plants (*Galanthus*) in which the Vessels consist of cells, with perforated walls, the contents do not resemble latex, but are only clear sap, with raphides, i.e., slender crystals of Oxalate of Lime. The latex, in Dicotyledons, is a peculiar fluid, which at once appears on breaking any part of a plant in which it exists. It is clear while in the uninjured tissues; but on exposure to the atmosphere, on a broken surface, it becomes turbid. It is then white, like milk, in most plants; but in some it is coloured yellow (*Chelidonium*) or orange by pigments in it. The microscope shows that it is chiefly composed of watery sap, in which float myriads of extremely minute granules: these, as in milk, are the cause of its opaque, white appearance when exposed to the air. On continued exposure to the air, or mixture with alcohol, acids, &c., masses separate from the latex in the form of "coagula," which usually become dark in colour. These coagula often afford useful products, e.g., Opium, and Caoutchouc, or Indiarubber. They vary considerably in composition, texture, and properties. The latex usually has dissolved in it small quantities of engar, gum, protoplasm, and alkaloids; and starch granules are present in the latex of some plants (*Euphorbia*). In the Papaw (*Carica Papaya*), there is a peculiar substance ("papayotin") dissolved in the latex, which exerts a digestive action on muscular fibre. It is believed by many botanists that the Laticiferous Vessels may be of the same use in plants that veins are in animals; but the plants that possess them are comparatively few, and there is never a central organ for propelling the latex, as the heart propels the blood. The latex, like the blood, contains substances employed in the nutrition of the plant, and also substances that must be regarded as mere excretions formed during the processes of growth, and that would be hurtful if allowed to remain in the cells. Laticiferous Vessels are confined to the higher plants; but Laticiferous cells occur among some of the cellular Cryptogams, and notably in the genus *Lactarius*, among Mushrooms.

**VESTIA** (named in honour of L. C. de Vest, 1776-1840, Professor at Grätz). ORD. *Solanaceæ*. A monotypic genus. The species is an interesting, erect, glabrous, much-branched, greenhouse shrub. For culture, see **Cestrum**.

**V. lycioides** (Lycium-like). Chilian Box-thorn. fl. yellow, solitary or few at the tips of the branches, pendulous; calyx shortly five-toothed, ½ in. long; corolla tube ½ in. long, the limb of five induplicate-valvate lobes; stamens five, exerted. June. l. entire, oblong or obovate, shining, slightly fleshy, 1½ in. to 3 in. long; petioles about ½ in. long, channelled above. h. 3 ft. Chili, 1815. (B. M. 2412; B. R. 299.)

**VETCH.** See **Vicia**.

**VETCH, BASTARD OR BLADDER.** See **Phaca**.

**VETCH, BITTER.** See **Orobis**.

**VETCH, CHICKLING.** See *Lathyrus sativus*.

**VETCH, CROWN.** A popular name for *Coronilla* (which see).

**VETCH, LIQUORICE.** A common name for *Astragalus glycyphyllos* (which see).

**VEXILLUM.** The standard or large posterior petal in a papilionaceous corolla.

**VIBORGIA** (named in honour of Eric Viborg, 1759-1822, Professor of Botany at Copenhagen). SYN. *Wiborgia*. ORD. *Leguminosæ*. A genus consisting of seven species of South African, rigid, sometimes spiny, greenhouse

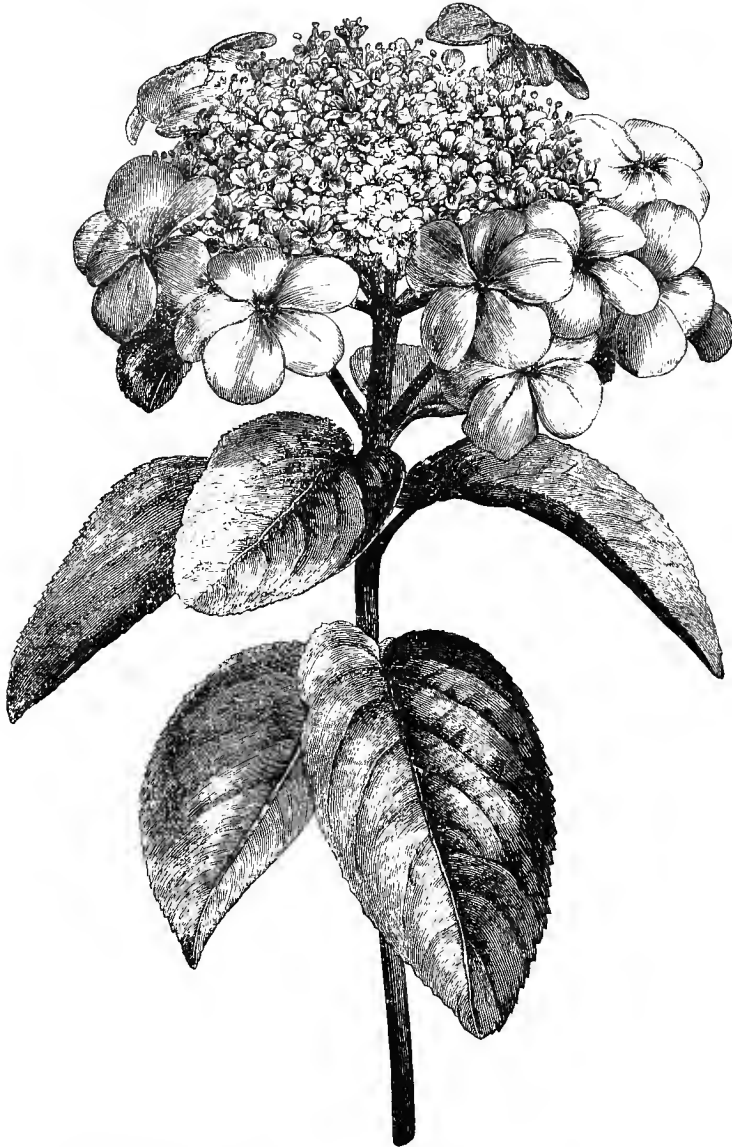


FIG. 168. FLOWERING BRANCHLET OF *VIBURNUM MACROCEPHALUM KETELEERI*.

**VETCH, MEDICK.** A common name for *Onobrychis* (which see).

**VETCH, MILK.** See *Astragalus*.

**VEXILLARY.** An aestivation in which one piece is considerably larger than the others, and is folded over them, they being arranged face to face, as in papilionaceous flowers.

shrubs. Flowers yellow, in terminal, often unilateral racemes; calyx teeth sub-equal; standard ovate or orbicular; keel incurved; bracts and bracteoles small or inconspicuous. Pods stipitate, flat, indehiscent. Leaves digitately trifoliate. Only one species calls for mention in this work. It thrives in a mixture of sandy loam and fibry peat. Cuttings of young shoots should be inserted in sandy soil, under a glase, in May.



**Viborgia**—continued.

**V. oboordata** (obcordate-leafted). *fl.*, racemes terminal or spuriously lateral, 3in. to 6in. long, densely many-flowered. *July*. *l.* rather distant; leaflets cuneate-oblong, obtuse or emarginate, the young ones thinly silky, the older ones glabrate. Branches long, twiggy, graceful. *h.* 3ft. to 6ft. *SYN.* *Crotalaria floribunda* (L. B. C. 593).

**VIBURNUM** (the old Latin name used by Virgil, &c.). Including *Timus*. *ORD.* *Caprifoliaceæ*. A genus comprising about eighty species of mostly hardy, deciduous trees and shrubs, indigenous in North temperate and subtemperate regions and the Andes, rare in the West Indies and Madagascar. Flowers white or pinkish, articulated with the pedicels, one or two-bracteolate, disposed in axillary or terminal, sub-umbellate corymbs or panicles, hermaphrodite, or the outer ones larger and neuter; calyx tube turbinate or ovoid, the limb short, equally five-toothed, persistent; corolla rotate, campanulate, or tubular, the limb of five equal, imbricated lobes; stamens five, inserted in the corolla tube (in one species biseriate); filaments short or elongated; anthers oblong, exserted; disk none. Drupe dry or fleshy, ovoid or globose, terete or compressed, one or spuriously two or three-celled, one-seeded. Leaves opposite, very rarely ternately whorled, petiolate, entire, serrated or dentate; stipules inconspicuous or obsolete, in a few cases ample. The culture is of the easiest description. The species thrive in almost any soil, and may be readily propagated by layering, or by cuttings of the half-ripened shoots, inserted in sandy soil, under handlights, in a somewhat shady position. The best-known species are here described; except where otherwise indicated, they are hardy, deciduous shrubs with white flowers, from North America.

**V. acerifolium** (Maple-leaved). Dockmackie. *fl.*, cymes small, on slender peduncles. May and June. *fr.* crimson, turning purple, with a flattened stone. *l.* coarsely toothed and somewhat three-lobed, roundish, the base truncate or cordate, the pointed lobes diverging. *h.* 3ft. to 6ft. 1736. (W. D. B. 118.)

**V. cotinifolium** (Cotinus-leaved). Indian Wayfaring-tree. *fl.* small; corymbs 2in. to 5in. in diameter, generally terminal, dense, the branches stellately tomentose. June. *l.* ovate or elliptic, obtuse at base, nearly entire, rarely coarsely crenate, usually woolly beneath. *h.* 5ft. to 10ft. Himalayas, 1830. (B. R. 1650.)

**V. dentatum** (toothed-leaved).\* American Arrowwood. *fl.* in pedunculate cymes. June. *fr.* blue or purple, small, ovoid. *l.* broadly ovate, slightly cordate at base, very numerous and sharply toothed, pale, often with hairy tufts in the axils of the straight veins; petioles slender. *h.* 5ft. to 10ft. 1763. (W. D. B. 25.)

**V. dilatatum** (dilated).\* *fl.* ½in. in diameter, very shortly pedicellate; cymes sessile or on stout peduncles, much branched, 2in. to 6in. in diameter. June. *l.* variable, 2in. to 5in. long, orbicular to obovate, usually abruptly and obtusely pointed, coarsely toothed, rounded or cordate at base, slightly hairy; petioles ½in. long. *h.* 10ft. Japan, 1845. A very handsome shrub. (B. M. 6215.)

**V. edule** (edible). A synonym of *V. Opulus*.

**V. Fortunei** (Fortune's). A garden synonym of *V. macrocephalum*.

**V. Keteleeri**. See *V. macrocephalum Keteleeri*.

**V. Lantana** (pliant). Common Wayfaring-tree. *fl.* ½in. in diameter, all perfect; cymes flat-topped, with stout rays. May and June. *fr.* black, flattened, ½in. long. *l.* broadly oblong-cordate, 2in. to 4in. long, serrulated, rugose, obtuse, exstipulate. *h.* 6ft. to 20ft. Europe (Britain). Shrub scurily pubescent. (J. F. A. 341; Sy. En. B. 640.)

**V. L. foliis-variegatis** (variegated-leaved). *l.* variegated with white and yellow.

**V. lantanoides** (Lantana-like). American Wayfaring-tree; Hobble Bush. *fl.* handsome, in very broad and flat, sessile cymes, the outer flowers much the larger. May. *fr.* red, turning darker, ovoid. *l.* round-ovate, ½in. to ¾in. across, abruptly pointed, cordate at base, closely serrated, pinnately many-veined, the veins beneath (as well as the stalks and branchlets) rusty-scurfy. 1820. A straggling shrub, the reclining branches often rooting. (L. B. C. 1570.)

**Viburnum**—continued.

**V. Lentago** (Lentago). Sheep Berry; Sweet Viburnum. *fl.* all perfect, in a sessile cyme. May and June. *fr.* black, or with a blue bloom, edible, sweet, oval, ½in. or more long. *l.* ovate, strongly pointed, closely and very sharply serrated; petioles long and margined. *h.* 15ft. to 30ft. 1761. Tree. (W. D. B. 21.)

**V. macrocephalum** (large-headed).\* *fl.* in compound, subpyramidal cymes, the neuter flowers large. June. *l.* ovate, flat, obtuse, denticulate, slightly scabrous, beneath (as well as the branches, petioles and peduncles) stellately furfuraceous-pubescent. *h.* 20ft. China, 1844. (B. R. 1847, 43; F. d. S. 263, 264.) *SYN.* *V. Fortunei* (of gardens).

**V. m. Keteleeri** (Keteleer's). This is the wild type, and bears the same relationship to *V. macrocephalum* that the wild *V. Opulus* does to the garden *V. O. sordidus*. See Fig. 168. (R. H. 1863, 31.)

**V. molle** (soft). *fl.* in pedunculate, stellate-pubescent cymes. July. *fr.* purple or blue, ovoid, small, oily. *l.* broadly oval, obovate, or ovate, scarcely pointed, slightly cordate at base, coarsely crenate or repand-toothed, the lower surface, as well as the rather slender petioles and branchlets, softly downy. *h.* 6ft. to 12ft. 1812.

**V. nudum** (naked). American Withe Rod. *fl.* all alike and perfect; cyme shortly pedunculate. May and June. *fr.* black, or with a blue bloom, globose, sweet, round-ovoid, ½in. long.



FIG. 168. FLOWERING BRANCHLET OF VIBURNUM OPULUS STERILIS

*l.* rather thick, oval, oblong, or lanceolate, not shining, the margins entire, repund, or crenate. *h.* 6ft. to 10ft. 1752. (B. M. 2281; W. D. B. 20.)

**V. n. cassinioides** (Cassine-like). *l.* more opaque, often toothed. 1761. (W. D. B. 24, under name of *V. squamatum*.)

**V. n. Claytoni** (Clayton's). *l.* nearly entire, the veins somewhat prominent beneath.

**V. obovatum** (obovate-leaved). *fl.* in small, sessile cymes. May. *fr.* black, or with a blue bloom, sweet, ovoid-oblong. *l.* obovate or spatulate, obtuse, entire or denticulate, rather thick, ½in. to 1½in. long, shining. *h.* 2ft. to 8ft. 1812. (L. B. C. 1476.)

**V. odoratissimum** (very odorous).\* *fl.* with the scent of *Olea fragrans*; corymbs 2in. to 4in. high, usually pedunculate. May. *fr.* ovoid-oblong, ½in. by ¾in., hardly compressed. *l.* elliptic, 5½in. long, acute, cuneate at base, entire or sparingly sinuate-toothed, coriaceous, glabrous; petioles stout, ½in. to 1in. long. *h.* 6ft. to 10ft. Khasia Mountains, China, &c. 1818. Half-hardy. (B. R. 456.)

**V. Opulus** (Opulus).\* Cranberry-tree; Dog Eller; Dog Rowan-tree; Guelder Rose; Marsh or Water Elder; Snowball-tree. *fl.*, outer ones white, ½in. in diameter; inner ones creamy-white, ½in. in diameter; cymes sub-globose, 2in. to 4in. in diameter. June and July. *fr.* red, globose, translucent, ½in. in diameter. *l.* 2in. to 5in. long, three-lobed, stipulate, the young ones downy; lobes unequal, serrated; stipules glandular, adnate to the petioles. Branches slender, lenticellate. *h.* 6ft. to 8ft. Europe (Britain) and North America. (F. D. 661; Sy. En. B. 639.) *SYNS.* *V. edule*, *V. arxycecos* (L. B. C. 1123).

**Viburnum**—continued.

**V. O. foliis-variegatis** (variegated-leaved). *l.* variegated with white and yellow.

**V. O. nana** (dwarf). A very distinct little plant, scarcely 1 ft. in height.

**V. O. sterilis** (sterile).\* Garden Guelder Rose; Snowball-tree. *fl.*, nearly the whole cyme consisting of radiant, sterile flowers, and becoming globular. A very handsome shrub. See Fig. 169.

**Viburnum**—continued.

obtuse or sub-acute, slightly revolute-margined, crenulate-serrulate. Branches terete, erect. *h.* 6 ft. to 7 ft. Japan, 1875. (B. M. 6172.) SYN. *V. suspensum*.

**V. suspensum** (uncertain). A synonym of *V. Sandankwa*.

**V. Tinus** (Tinus).\* *Laurustinus*. *fl.* white, but rose-coloured before expansion, and sometimes a little time afterwards; corymbs flat. December to March. *fr.* dark blue. *l.* ovate-

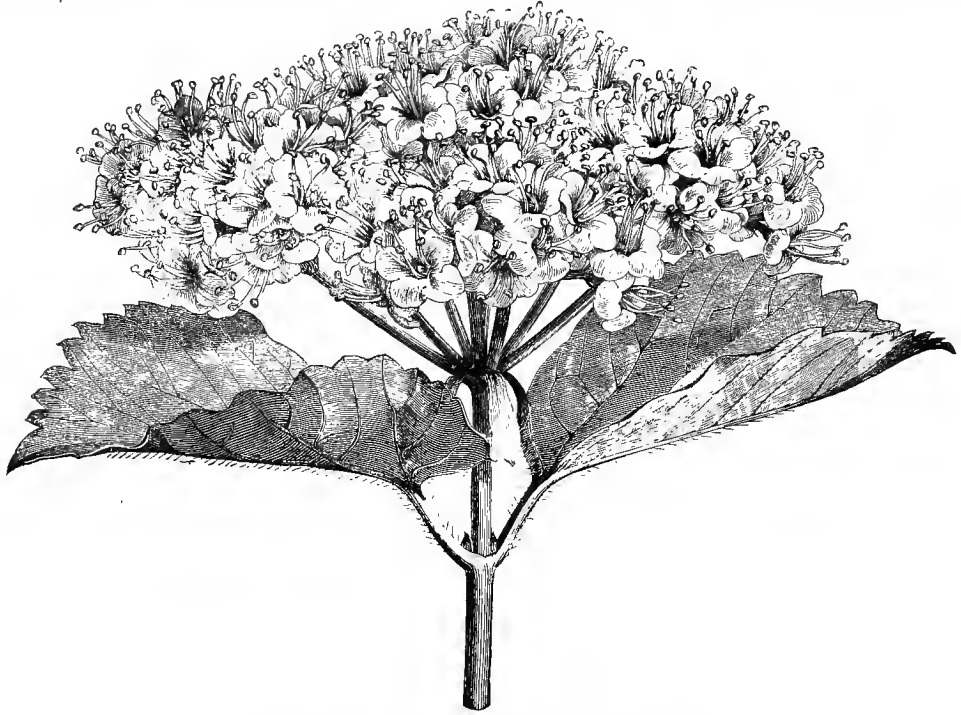


FIG. 170. FLOWERING BRANCHLET OF VIBURNUM PUBESCENS.

**V. orientale** (Eastern). *fl.* in terminal, not radiant, corymbs. July. *fr.* oblong, compressed. *l.* three-lobed, acuminate, coarsely and bluntly toothed; petioles glandless, glabrous. *h.* 6 ft. to 10 ft. Caucasus, 1827, 1865. (R. G. 567.)

**V. oxycoccos** (Cranberry-fruited). A synonym of *V. Opulus*.

**V. plicatum** (plaited).\* *fl.* radiant, in the cultivated plant all sterile, dilated, and crowded in globose cymes resembling those of the Guelder Rose. May. *l.* rounded at base, ovate or somewhat ovate-orbicular, cuspidate, coarsely serrated, somewhat plicate, dark green, glabrous above, tomentose beneath. *h.* 4 ft. to 6 ft. Japan, 1846. (B. R. 1874, 51; F. d. S. 278; G. C. n. s., vi., p. 141; L. J. F. 88; L. & P. F. G. 29; S. Z. F. J. 37.)

**V. p. tomentosum** (tomentose). This differs from *V. plicatum* in its more hairy leaves, and in the sterile flower being generally confined to the outer part of the inflorescence. (S. Z. F. J. 38, under name of *V. tomentosum*.)

**V. prunifolium** (Prunus-leaved).\* American Black Haw. *fl.* in a sessile cyme. May. *fr.* similar to, or rather smaller than, that of *V. Lentaga*. *l.* oval, obtuse or slightly pointed, finely and sharply serrated, 1 in. to 2 in. long. 1751. A tall shrub or small tree. (W. D. B. 23.)

**V. pubescens** (downy). *fl.* in pedunculate cymes. June. *fr.* dark purple, small, ovoid. *l.* ovate or oblong-ovate, acute or acuminate, the veins and teeth fewer and less conspicuous than in *V. dentatum*, the lower surface and the very short petioles softly downy, at least when young. 1736. Low and straggling. See Fig. 170.

**V. rugosum** (wrinkled-leaved). *fl.* all fertile; corymbs not radiant; general involucre seven-leaved. December to March. *fr.* ovate-oblong. *l.* broad, ovate, wrinkled, hairy. *h.* 4 ft. to 6 ft. Canary Islands, 1796. A half-hardy, evergreen shrub, very like *V. Tinus*, but having leaves larger, and hairy all over. (B. M. 2082; B. R. 376; L. B. C. 859.)

**V. Sandankwa** (Sandankwa). *fl.*, corymbs mostly terminal, sometimes axillary, short, small, erect, trichotomous. June. *fr.* red, globose. *l.* shortly petiolate, ovate or ovate-oblong,

oblong, quite entire; ramifications of the veins beneath, as well as the branchlets, glandular-hairy. *h.* 8 ft. to 10 ft. South Europe, &c., 1596. Evergreen. See Fig. 171. (B. M. 38.)

**V. T. Froebellii** (Froebel's). A compact form, with lighter green leaves and whiter flowers than the type.



FIG. 171. FLOWERING BRANCHLET OF VIBURNUM TINUS.

**Viburnum**—continued.

**V. T. hirtum** (hairy). *fl.* appearing in autumn, and persistent through the winter. *l.* oval-oblong, hairy beneath and on the margins.

**V. T. lucidum** (clear-leaved).\* *fl.* and cymes larger than in the type. Spring. *l.* also larger, ovate-oblong, glabrous, shining. Mount Atlas. There is a form having leaves more or less variegated with white.

**V. T. strictum** (erect). A variety of somewhat erect and fastigiate habit. Gardens. There is also a variegated sub-variety.

**V. T. virgatum** (twiggy). *l.* oblong-lanceolate, pilose below and on the margins. Italy.

**VICIA** (the old Latin name used by Virgil, &c.). Tare; Vetch. Including *Ervum*. *Faba* is also included, by the authors of the "Genera Plantarum," under this genus, but is kept distinct in this work. ORD. *Leguminosæ*. A genus comprising about 100 species of mostly hardy, annual or perennial herbs, of variable habit, dispersed over North temperate regions and South America. Flowers often blue, violet, or yellowish-white, axillary, racemose; calyx teeth sub-equal, or the lower longer; standard obovate or oblong, emarginate; wings adnate to the keel; bracts very caducous. Pods compressed, two-valved. Leaves abruptly pinnate; leaflets usually numerous, entire or toothed at the tip; petiole often ending in a tendril. The following species are British: *V. angustifolia*, *V. bithynica*, *V. Cracca*, *V. hirsuta* (Common Tare), *V. lathyroides*, *V. lutea*, *V. Orobus* (Bitter Vetch), *V. sativa* (Common Vetch; Fitch; Fitches), *V. sepium*, *V. sylvatica* (Wood Vetch), *V. tetrasperma*, *V. hybrida* and *V. levigata*, formerly found in England, are now extinct. *V. sativa* is extensively grown as fodder for cattle. Few of the species are of any horticultural value. Those described below are of simple culture in common garden soil. They may be increased by seeds, the perennials also by divisions.

**V. argentea** (silvery).\* *fl.* pinkish, the tip of the keel spotted with black, second, rather loose; peduncles many-flowered. June. *l.* cinereous-silvery, without tendrils; leaflets oblong-linear, mucronate. Stem tetragonal. *h.* 1 ft. Pyrenees, 1827. Perennial. (B. M. 2946.)

**V. atropurpurea** (dark-purple). *fl.* purple, second, approximate; calyx teeth bristly; peduncles many-flowered, scarcely as long as the leaves. June. *l.* leaflets oblong, mucronate, opposite or alternate; stipules often toothed at base. Stem tetragonal. *h.* 3 ft. Algiers, 1815. A villous annual. (B. R. 871.)

**V. Cracca** (Cracca). Cow Vetch; Tufted Vetch. *fl.* bright blue, 4 in. long, drooping; racemes dense, ten to thirty-flowered, unilateral; peduncles longer than the leaves. June to August. *l.* 1 in. to 4 in. long, sessile, linear-oblong, acute or mucronate. Stems 2 ft. to 6 ft. long, scandent or diffuse. Europe (Britain). Perennial. (F. D. 804; Sy. En. B. 385.)

**V. galegifolia** (Galega-leaved). A synonym of *Swainsona galegifolia*.

**V. lathyroides** (Lathyrus-like). Spring Vetch; Strangle Tare. *fl.* lilac-coloured, solitary, sessile, 1 in. to 1 1/2 in. long; calyx teeth subulate. May and June. *l.* 1/2 in. to 1 in. long; leaflets two or three pairs, linear-oblong or obovate, acute, obtuse, or notched. Stem 6 in. to 8 in. long, spreading. Europe (Britain). A hairy annual. (Sy. En. B. 396.)

**V. onobrychoides** (Onobrychis-like).\* *fl.* purple, distant; calyx teeth lanceolate; peduncles very long, many-flowered. June. *l.* numerous, linear, alternate or opposite, obtuse or mucronate. Stem striated. *h.* 2 ft. South Europe, 1759. Annual. (A. F. P. 42; B. M. 2206.)

**V. oroboides** (Orobus-like). *fl.* of a very beautiful blue, usually three or four racemes standing together; peduncles many-flowered, axillary. June. *l.* leaflets ovate, mucronate. *h.* 1 ft. to 2 ft. Siberia, 1758. Perennial. SYN. *Orobus lathyroides* (B. M. 2098).

**V. polysperma** (many-seeded). *fl.* pale blue, erect, loosely racemose; calyx teeth unequal; peduncles eight to ten-flowered, and longer than the leaves. June. *fr.*, pods linear-lanceolate, fourteen to twenty-seeded. *l.* leaflets fourteen to sixteen, ovate-oblong, obtuse, entire, mucronate, glabrous. Tendrils decoupled. Stems 6 ft. to 8 ft. long, much-branched. Naples, 1833. Climbing annual. (S. B. F. G. ser. ii. 274.)

**V. sicula** (little dagger). *fl.* of a fine purple, large, second, numerously disposed on pedunculate racemes. May. *l.* leaflets linear, bluish, mucronate, rather silky beneath. Stem tetragonal, almost simple, creeping. 1827. (B. M. 4943 and S. B. F. G. 289, under name of *Orobus Fischert.*)

**V. tenuifolia** (slender-leaved). *fl.* violet; calyx teeth unequal; racemes clustered, second; peduncles many-flowered, longer

**Vicia**—continued.

than the leaves. June. *l.*, leaflets linear, alternate or opposite, nearly glabrous, mucronate. Stems branched. *h.* 1 1/2 ft. Germany and Tauria, 1793. Climbing perennial. (B. M. 2141.)

**VICTORIA** (named after Her Majesty Queen Victoria).

ORD. *Nymphaeaceæ*. A monotypic genus. The species—a gigantic, handsome, prickly, aquatic, stove herb, with a thick rhizome—is one of the most remarkable productions of the vegetable kingdom. It is found, growing in still water of about 4 ft. to 6 ft. in depth, in equinoctial America. The peculiar formation of the under surface of the leaves imparts to them great buoyancy—sufficient, for instance, to withstand the weight of a good-sized child sitting in a chair, provided, by means of a flat board, the pressure be equally distributed over the whole of the leaf. In this country, at any rate, it is best to treat the Victoria as an annual, as it is difficult to keep alive during dull, sunless weather in winter. The seeds—which should be kept in a vessel of water until ready for sowing—should be placed in loamy soil, and the pot containing them submerged a couple of inches in a "nursery" tank of water, the temperature of which should not be allowed to fall below 85 deg. The tank, too, should be in as light a position, and as near the glass, as possible. It is desirable to sow the seeds in January, and as soon as the seedlings appear, prick them singly into small pots, gradually shifting into larger pots as the plants grow stronger. About the beginning of May, the best plant will probably be ready to place out in the large tank. Two or three cartloads of good, strong loam, with a good proportion of rotted cowdung, will be necessary to enable the plant to attain its full size. After it is fairly established, the temperature of the water may be allowed to fall to 80 deg., but not below. All the sunlight possible is needed to keep the plant in robust health, so the house in which it is grown should not be artificially shaded in any way. Where it is practicable to maintain the water of a large tank at the temperature above mentioned, the Victoria may be grown in the open air in places sheltered from the wind, which has—except under such conditions—too much power on the upturned edges of the huge leaves. The illustration represents a plant in the open, surrounded by hardy subjects.

**V. regia** (royal).\* Queen Victoria's Water Lily; Royal Water Lily; Water Maize; Water Platter. *fl.* 1 ft. or more in diameter; calyx deeply quadridriform, the tube tawny, very prickly, turbinate, adnate with the ovary, the segments purple-brown, concave, deciduous, rather shorter than the petals; torus annular; petals very numerous, the outer ones white, spreading, oblong, concave, obtuse, the inner ones gradually passing into filaments and becoming deeply coloured with purple or light rose; perfect stamens in about two series, large, fleshy, subulate, gracefully incurved below, the rest erect; peduncles or scapes radical, longer than the petiole, and rising above the surface of the water when in flower, terete, prickly, sometimes 1 in. in diameter, single-flowered. Summer. *fr.* a large, cyathiform, truncate, fleshy, green, prickly berry, bearing many oval, very dark brown seeds. *l.* usually floating, 4 ft. to 6 ft. in diameter, at first oval with a deep, narrow cleft or sinus at one end, at last almost exactly orbicular, peltate, flat, but having a turned-up margin 2 in. to 5 in. broad; upper side full green, reticulated; under side deep purple, sometimes green, spongy-pubescent, copiously veined, more or less beset with sharp and horny, subulate prickles; petioles terete, radical, copiously prickly. Rhizome thick. 1838. See Fig. 172, p. 158. (B. M. 4275-4276.)

**VICTORIAN DOGWOOD.** See *Prostanthera lasianthos*.

**VICTORIAN HAZEL.** See *Pomaderris apetala*.

**VICTORIPERREA.** A synonym of *Freycinetia* (which see).

**VIEUSSEUXIA.** Included under *Moræa* (which see).

**VIGIERA.** A synonym of *Escallonia* (which see).

**VIGNA** (named after Dominic Vigni, Professor at Padua, who wrote a commentary on Theophrastus, in 1625). SYN. *Callicystus*, *Scytalis*. ORD. *Leguminosæ*. A genus embracing about thirty species of stove, greenhouse, or hardy, twining or prostrate herbs, inhabiting

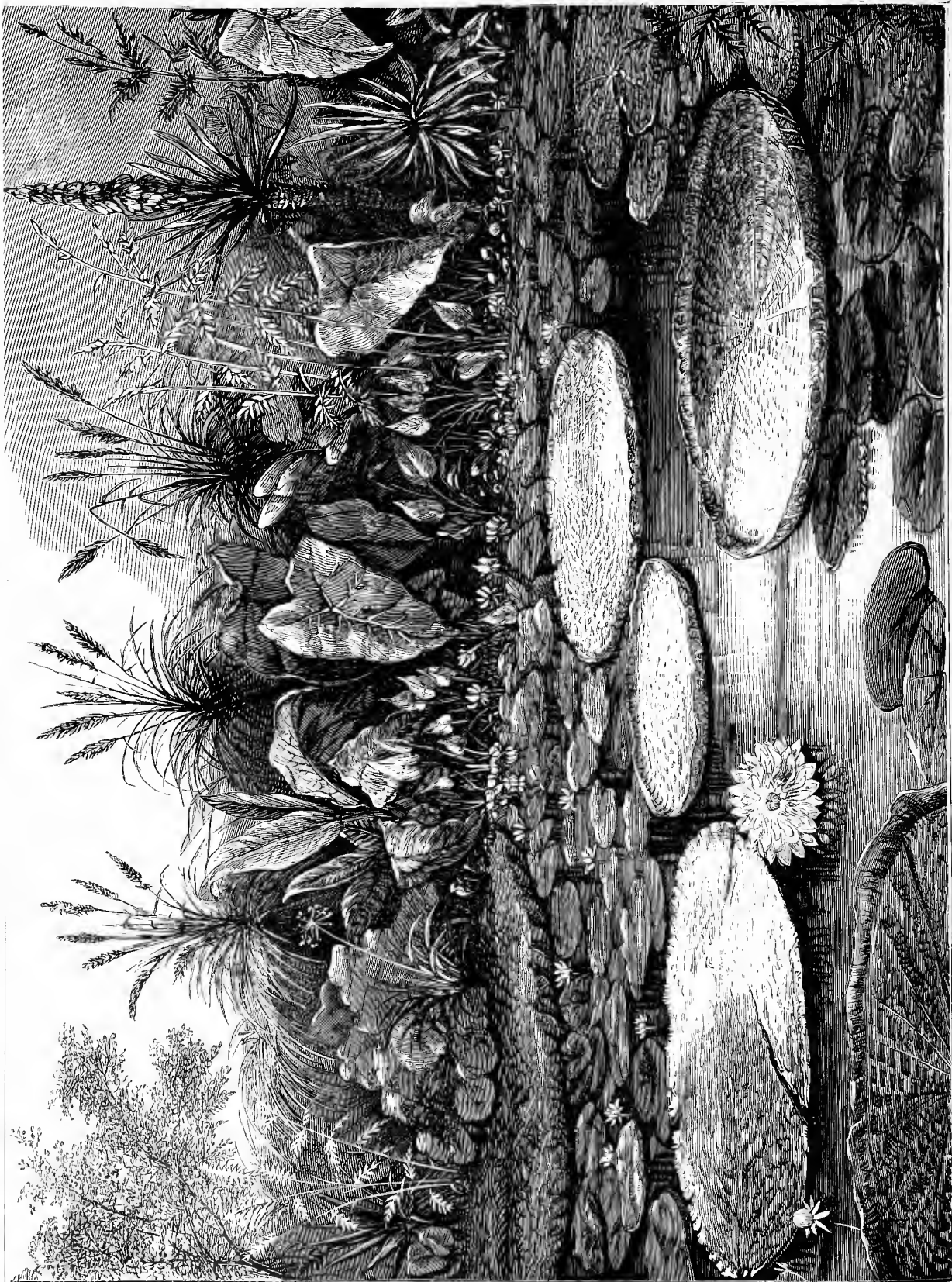


FIG. 172. VICTORIA REGIA (page 157).



**Vigna**—continued.

the warmer regions of the globe. Flowers yellowish or rarely purplish, shortly fasciculate-racemose at the apex of an axillary peduncle; two upper calyx teeth or lobes connate or distinct; corolla with two ear-like appendages; standard orbicular; wings falcate-obovate; bracts and bracteoles small, caducous. Pods linear, straight or scarcely incurved. Leaves pinnately trifoliate, stipellate. *V. sinensis* is largely cultivated in the East; the Chinese cook and eat the pods as we do kidney beans. Seeds of the under-mentioned species may be sown in any fairly good soil.

**V. Burchellii** (Burchell's). *fl.* purple, on peduncles 3 in. to 5 in. long, umbellate; calyx deeply four-cleft; wings with an ear-shaped appendage to the claw. Summer. *l.* lin. to 2½ in. long, on petioles ½ in. to ¾ in. long; leaflets ovate-lanceolate or lanceolate, rigid, bristly-mucronate, glabrous. Stems woody, diffuse, the branches rigid and sub-erect. Cape of Good Hope, 1816. Greenhouse. *SYN. Oxyptera Burchellii*.

**V. Catjang** (Catjang). *fl.* yellow or reddish; corolla twice the length of the calyx, which is less than ½ in. long; racemes few-flowered, long-peduncled. July and August. *fr.*, pods 1 ft. to 2 ft. long, less than ½ in. broad, edible. *l.*, leaflets membranous, ovate-rhomboid, entire or slightly lobed. East Indies, &c., 1776. Hardy, low and sub-erect, or tall and twining annual. *SYN. Dolichos sinensis* (B. M. 2232). This has been grown as a vegetable in France under the name of *Phaseolus Riccardianus*.

**V. glabra** (glabrous). *fl.* yellow, crowded; racemes borne on stout peduncles, which are longer than the leaves. July to September. *fr.*, pods hirsute. *l.*, leaflets ovate or ovate-lanceolate. Southern United States, 1685. Nearly hardy, twining annual. *SYN. Dolichos tuteolus*.

**VIGNALDIA**. A synonym of **Pentas** (which see).

**VIGUIERA** (named after Alexander Viguier, a bookseller, of Montpellier, who wrote a work on Poppies, in 1814). *ORD. Compositæ*. A genus comprising about sixty species of greenhouse or half-hardy, erect, branched, annual or perennial herbs, rarely shrubs, inhabiting the warmer parts of America. Flower-heads mediocre, rarely large, pedunculate at the tips of the branches, heterogamous; involucre broadly campanulate or hemispherical, the bracts in three or more series; receptacle convex, conical, or at length oblong, paleaceous; achenes often more or less pilose. Lower leaves (rarely all) opposite; upper ones usually alternate. Only one species calls for mention here. For culture, see **Helianthus**.

**V. linearis** (linear-leaved). *fl.*-heads yellow; involucre scales oblong, leafy-appendiculate at apex. September. *l.* sessile, alternate, rarely opposite, linear, entire, one-nerved, revolute-margined, hispid-scarious on the nerves. Stems erect, branched, scabrid. *h.* 2 ft. Mexico, 1823. Half-hardy perennial. *SYN. Helianthus linearis* (B. R. 523).

**V. rigida** (rigid). A synonym of *Helianthus rigidus*.

**VILFA** (of Adanson). A synonym of **Agrostis** (which see).

**VILFA** (of Beauvois). A synonym of **Sporobolus** (which see).

**VILLA GARDEN**. See **Garden**.

**VILLANOVA** (named after Tomas M. Villanova, 1757-1802, Professor of Botany at Valencia). *ORD. Compositæ*. A small genus (six or seven species) of greenhouse or hardy, diffuse, glandular-pubescent herbs, inhabiting Peru, Columbia, and Mexico. Flower-heads yellow, heterogamous, pedunculate, irregularly paniculate or corymbose; involucre campanulate, with a few sub-equal bracts; receptacle small, naked; ray florets ligulate, three-toothed; disk florets five-cleft; achenes glabrous. Lower leaves (or all) opposite, the upper ones often alternate, ternately or pinnately dissected, often few-lobed. *V. chrysanthemoides*, the only species introduced, is a hardy annual. Seeds should be sown on the open border, in April.

**V. chrysanthemoides** (Chrysanthemum-like). *fl.*-heads lin. in diameter; ray florets fifteen to twenty; peduncles stout, glandular, naked or with one or more imperfect leaves. September. *l.* alternate, petiolate, 2 in. long and broad, twice ternately cut into linear or obovate, laciniate, recurved lobes. Stem grooved, leafy, erect. *h.* 1 ft. to 2 ft. Rocky Mountains, 1878. (B. M. 6422.)

**VILLANOVA** (of Ortega). A synonym of **Parthenium** (which see).

**VILLARESIA** (named after Matthias Villarez, a Spanish botanist, Superintendent of the Gardens at Santa Espina). *SYN. Citronella*. *ORD. Olacineæ*. A genus consisting of eight or ten species of stove, evergreen, climbing shrubs or small trees, inhabiting the tropics of both hemispheres. Flowers white; calyx five-parted; petals five, ribbed inside; stamens five; cymes small, paniculate or racemose. Leaves alternate, oblong, entire or spinulose-dentate, thickly coriaceous, clear. Only one species has been introduced. For culture, see **Olax**.

**V. mucronata** (mucronate-leaved). *fl.* fragrant, sessile; racemes terminal and in the upper axils, solitary, rarely in twos or threes, 2 in. long. September and October. *l.* shortly petiolate, ovate or oblong, mucronate, highly glabrous, shining above, paler beneath, spiny-toothed in young trees, entire in adults. Trunk erect, terete. Chili. Tree.

**VILLARIA**. A synonym of **Berardia** (which see).

**VILLARSIA** (named in honour of Dominique Villars, 1745-1814, Professor at Grenoble; he wrote on the plants of Dauphiné). *SYN. Renealmia* (of Houttuyn). *ORD. Gentianaceæ*. A genus embracing ten species of South African or Australian, marsh-loving, greenhouse herbs. Flowers yellow or white, cymose; calyx five-parted or deeply five-cleft; corolla broadly campanulate, sub-rotate, the lobes valvate; stamens five, affixed to the tube; filaments filiform. Radical leaves long-petiolate, entire or irregularly sinuate-toothed. Stems simple and leafless, or slightly branched and furnished with a few leaves. The following species are known to cultivation, and form elegant subjects when in blossom. Peat and sand form the most suitable compost, and the pots in which the plants are grown should be placed in water. Propagation may be readily effected by divisions, or by seeds.

**V. capitata** (headed). *fl.* yellow, sessile, in compact, globular or depressed heads about ½ in. in diameter, on long peduncles. Summer. *l.* long-petiolate, broadly ovate, orbicular, or reniform, coarsely sinuate-toothed or entire, under 1 in. long. Stems slightly branched, leafy, 6 in. high. Australia, 1879. (B. M. 6420.)

**V. Crista-galli** (cock's comb). A synonym of *Menyanthes Crista-galli*.

**V. Humboldtiana** (Humboldt's). A garden name for a form of *Linanthemum indicum*.

**V. nymphaeoides** (Nymphaea-like). A synonym of *Linanthemum nymphaeoides*.

**V. ovata** (ovate-leaved). *fl.* citron-yellow; corolla segments crenate-fimbriate on the margins, pilose at the base within; cymes terminal, raceme-like. June. *l.* clustered, coriaceous, oval, entire. Stems ascending, nearly naked. *h.* 6 in. Cape of Good Hope, 1786. *SYN. Menyanthes ovata* (B. M. 1909).

**V. parnassifolia** (Grass of Parnassus-leaved).\* *fl.* yellow; corolla lobes shortly exceeding the calyx. August. *l.* long-petiolate, ovate or almost orbicular, entire or sinuate-crenate, slightly cordate or rounded at base, mostly under 1 in. long. Flowering stems 1 ft. to 2 ft. high, loosely paniculate, leafless except small bracts, or a solitary leaf at the first branching. Australia, 1825. (B. R. 1533, under name of *V. reniformis*.)

**V. reniformis** (kidney-shaped).\* *fl.* yellow; corolla spreading, ½ in. to 1 in. in diameter, the lobes copiously bearded or fringed inside at base. July. *l.* in a dense tuft, on long petioles, ovate to orbicular or reniform, more or less cordate at base, entire or slightly sinuate-toothed, mostly 1 in. to 2 in. long. Flowering stems as in *V. parnassifolia*. *h.* 6 in. to 3 ft. Australia, 1820. *SYN. Menyanthes exaltata* (B. M. 1029). The plant figured in B. M. 1328 as *Menyanthes sarmentosa* is only a stoloniferous form of this species.

**VILLOSE, VILLOUS**. Shaggy; covered with long and soft (not interwoven) hairs or villi.

**VILMORINIA** (named after Pierre Louis Vilmorin, a French cultivator, who wrote on leguminous plants in 1825). *ORD. Leguminosæ*. A genus containing three species of erect, stove shrubs, natives of San Domingo, requiring similar culture to that recommended for **Clitoria**. The only species introduced is described below; it is probably no longer in cultivation.

**V. multiflora** (many-flowered). Vilmorin's Purple Pea-flower. *fl.* purple, in axillary racemes; calyx cylindrical, obtusely four-toothed, sub-bilabiate; petals narrow-oblong, the wings shorter than the keel. May. *l.* imparipinnate; leaflets five or six-jugate, oval, pubescent beneath; stipules rather broad at base, long-subulate. *h.* 6 ft. 1826. *SYN. Clitoria multiflora*.

**VIMINARIA** (from *vimen*, a twig; alluding to the twiggy, leafless branches). Rush Broom. ORD. *Leguminosæ*. A monotypic genus. The species is a greenhouse shrub, with Rush-like stems. It thrives in a mixture of loam and peat. Propagation may be effected by cuttings of half-ripened shoots, inserted in sand, under a bell glass, in April; or by seeds, sown on a gentle hotbed.

**V. denudata** (naked). Australian Rush Broom; Victorian Swamp Oak. *fl.* orange-yellow, small, in long, terminal racemes; calyx teeth short, equal; petals on rather long claws; wings shorter than the standard; stamens free. August. *l.* alternate, mostly reduced to filiform petioles 3 in. to 9 in. long, the lower ones on luxuriant specimens occasionally bearing at the extremity one to three oval-oblong or lanceolate, herbaceous leaflets, 1/2 in. to 1 1/2 in. long. *h.* 10 ft. to 20 ft. (or sometimes low and decumbent). Australia, 1780. (B. M. 1190; P. M. B. xiv. 123.)

**VIMINEOUS**. Having long, flexible twigs or shoots; e.g., many Osiers.

**VINCA** (*Vinca*, or *Pervinca*, was the old Latin name used by Pliny). Periwinkle. Including *Catharanthus*. ORD. *Apocynaceæ*. A genus comprising ten broadly-distributed species of pretty, stove, greenhouse, or hardy, erect, or procumbent herbs or sub-shrubs. Flowers rather large, axillary, solitary; calyx five-parted, without glands, the lobes narrow; corolla salver-shaped, the tube cylindrical, the five lobes ample; stamens above the middle of the tube, included. Leaves opposite. The best-known species are here described. *V. rosea*, which requires stove or greenhouse treatment, may readily be propagated from cuttings of young shoots, taken off soon after new growth is commenced in spring, and inserted in sandy loam, in a close frame. The points should be taken out as the young plants become established, to make them bushy; the flowers are borne on the new shoots as they lengthen. A compost of fibrous loam and a little decayed manure intermixed is well suited to the requirements of this species. It is not necessary to propagate every year, except for increasing stock: the old plants can be kept through the winter. The hardy Vincas are excellent trailing plants for furnishing banks, rockwork, roosteries, &c., in wild gardens, pleasure-grounds, and woods. They grow in almost any kind of soil, and spread rapidly when once established. Propagated by division: any of the single pieces with roots attached may be dibbled in from autumn until early spring.

**V. acutiflora** (acute-flowered). \* A synonym of *V. media*.

**V. herbacea** (herbaceous). *fl.* purplish-blue; corolla eight to eleven lines long, bearded in the middle and at the throat. June and July. *l.* elliptic or lanceolate, somewhat obtuse, 1 in. long, the margins revolute and slightly ciliated. Stems all fertile, herbaceous, glabrous, decumbent, simple. Eastern Europe, 1816. Hardy. (B. M. 2002; B. R. 301.)



FIG. 173. FLOWER OF VINCA MAJOR.

**V. major** (greater). \* Band-plant; Cut-finger. *fl.* blue-purple; calyx lobes ciliated, equalling the corolla tube. April and May. *l.* ovate, or cordate at base, ciliated. Flowerless stems rooting at the tip only; fertile ones erect in flower, elongated afterwards. Europe (Britain), &c. Larger in all its parts than *V. minor*. See Fig. 173. (Sy. En. B. 905.)

**V. m. elegantissima** (very elegant). \* A form with foliage beautifully margined or blotched with creamy-white.

**V. media** (intermediate). *fl.* blue; corolla 1 in. long, the lobes obliquely ovate, acuminate. August. *l.* ovate, narrowed at both ends, highly glabrous, 1 in. to 2 in. long, 1/2 in. to 1 in. broad. Sterile stems reclinate; fertile ones nearly erect, 1 ft. or more high. Mediterranean region. Hardy perennial. SYN. *V. acutiflora*.

**Vinca—continued.**

**V. minor** (lesser). \* *fl.* 1 in. in diameter; calyx lobes glabrous, one-third the length of the corolla tube; corolla blue-purple. April and May. *l.* 1 in. to 1 1/2 in. long, elliptic-ovate, with glabrous margins, on very short petioles. Stems tough; flowerless ones 1 ft. to 2 ft. long, prostrate, rooting; flowering ones short, erect. Europe (Britain), &c. (F. D. 1813; Sy. En. B. 906.) Of this pretty plant there are a variegated form, a white-flowered variety, and others with double white and double blue flowers.



FIG. 174. VINCA ROSEA, showing Habit and detached Flowering Branchlet.

**V. rosea** (rosy). \* Madagascar Periwinkle; Old Maid. *fl.* almost sessile; corolla tube 1 in. long; throat with a hairy ring over the tips of the stamens, and a slighter one at the narrow orifice; lobes white, with a pink eye, sometimes all rose-coloured or white, showy, obovate. March to October. *l.* long, on short petioles. South Florida, Tropics, 1758. Plant low, erect, puberulent. Greenhouse or stove. See Fig. 174. (B. M. 248.)

**VINCETOXICUM** (from *vincere*, to conquer, and *toxicum*, poison; in allusion to supposed antidotal powers). ORD. *Asclepiadææ*. A genus comprising about seventy species of stove, greenhouse, or hardy, erect or twining, perennial herbs or sub-shrubs, inhabiting temperate and warm regions, but rarer in the tropics. Flowers usually greenish-yellow or purplish, sometimes nearly black, in variable cymes; calyx five-parted; corolla somewhat rotate-campanulate, deeply five-cleft; corona affixed to the staminal tube, sub-entire, toothed, shortly five to ten-lobed or nearly five-parted. Leaves opposite or rarely quaternately whorled or alternate. The better-known species are here described. All (except *V. pilosum*) are hardy perennials. They were formerly classified under *Cynanchum* (which see for culture).

**V. acutum** (acute). *fl.* white; petals oblong, obtuse. July. *l.* oblong, ovate-cordate, acute. South Europe, 1596. Twiner.

**V. fuscum** (brown-flowered). *fl.* yellow; corolla bearded; umbels simple. July. *l.* ovate. Stems twining at top. *h.* 2 ft. to 3 ft. South-east Europe, 1817. SYN. *Cynanchum minus*.

**V. japonicum** (Japanese). *fl.* whitish, on slender pedicels; corolla segments glabrous; cymes shorter than the leaves, loose-flowered. Summer. *l.* rounded, shortly acuminate or retuse, very shortly mucronate, paler beneath, the veins softly puberulous and somewhat velvety. Japan. Plant somewhat twining above. (L. & P. F. G. iii., p. 150.)

**V. medium** (intermediate). *fl.* white; corolla beardless; pedicels hardly longer than the peduncle; umbels often divided. May. *l.* broadly ovate, obtuse, or ovate-lanceolate, acute. Stems twining at tops. *h.* 2 ft. to 3 ft. Eastern Europe, &c.

**V. nigrum** (black). *fl.* brown; corolla bearded; pedicels hardly longer than the peduncles; umbels simple. July. *l.* ovate-lanceolate, acuminate, finely ciliated on the edges, narrower than those of the next species. Stems twining at top. *h.* 2 ft. to 3 ft. South Europe, 1596. SYN. *Cynanchum nigrum* (B. M. 2390).

**V. officinale** (official). Tame Poison. *fl.* white; corolla beardless; pedicels three times longer than the peduncle; umbels simple. May. *l.* ovate, acuminate, finely ciliated on the edges when young. Stems erect, furnished with a downy line on each side. *h.* 1 ft. to 3 ft. Europe, 1596. SYN. *Cynanchum Vincetoxicum*.

**V. pilosum** (pilose). *fl.* white, on short, erect pedicels; peduncles nearly equalling the leaves, many-flowered. July. *l.* ovate,



**Vincetoxicum**—*continued*.

rounded and mucronulate at apex, rounded or sub-cordate at base. Cape of Good Hope, 1726. Greenhouse, twining sub-shrub. SYN. *Cynanchum pilosum* (B. R. 111).

**V. purpurascens** (purplish). *fl.* dull purple, on slender pedicels; cymes long-stalked, many-flowered, proceeding from the axils of the upper leaves. *l.* narrow-oblong, mucronate, becoming smaller near the ends of the shoots where the flowers appear.

**Vine**—*continued*.

Caspian Sea. According to De Candolle, in "L'Origine des Plantes Cultivées," it grows there "with the luxuriant wildness of a tropical creeper, clinging to tall trees, and producing abundant fruit without pruning or cultivation (see Fig. 175). . . Its dissemination by birds and other agencies must have begun very early—perhaps

before the existence of man in Europe, or even in Asia.

Seeds of the Grape Vine have been found in the lake dwellings of Castione, near Parma, which date from the age of bronze . . . and Vine leaves have been found in the tufa round Montpellier—probably deposited before the historical epoch." Records of the cultivation of the Grape, and of the making of wine, in Egypt, go back 5,000 to 6,000 years.

The introduction of the Vine into this country is generally credited to the Romans, in the reign of the Emperor Augustus, about A.D. 10. Vineyards existed in England at a very early period of our history. They are mentioned in the "Domesday Book," and also by Bede, who wrote in A.D. 731. The Isle of Ely was called the Isle of Vines by the Normans, the Bishop of Ely, shortly after the Conquest, receiving as tithes wine made from the Vines grown in his diocese. In the reign of Henry III. we read of vineyards. Malmesbury mentions the county of Gloucester as being, in his time, very rich in vineyards; and there still remain traces of them at Tortworth. The first Earl of Salisbury planted a vineyard at Hatfield, which is noted as being in existence when Charles I. was taken there as a prisoner. There are records of vineyards existing in various parts of Surrey, and a notable one, which is still partly in existence, once flourished at Bury St. Edmunds. Vineyards seem to have been common to all monastic establishments; but the suppression of the latter, and, subsequently, the fact of cheap foreign wines becoming more easily accessible, led, no doubt, to neglect in Grape cultivation.

Of noteworthy Grape Vines, Speechly, who wrote on the Vine at the end of the last

century, mentions one that was growing in the open air at Northallerton, in Yorkshire, in 1789, that had covered a space of 132 square yards, and was supposed to have been planted 150 years. During the last century, the cultivation of Grapes seems to have become pretty general; several notable examples being still in existence—as that of the Black Hamburgh Vine at Valentines, Ilford, in Essex, which Gilpin, in his "Forest Scenery,"

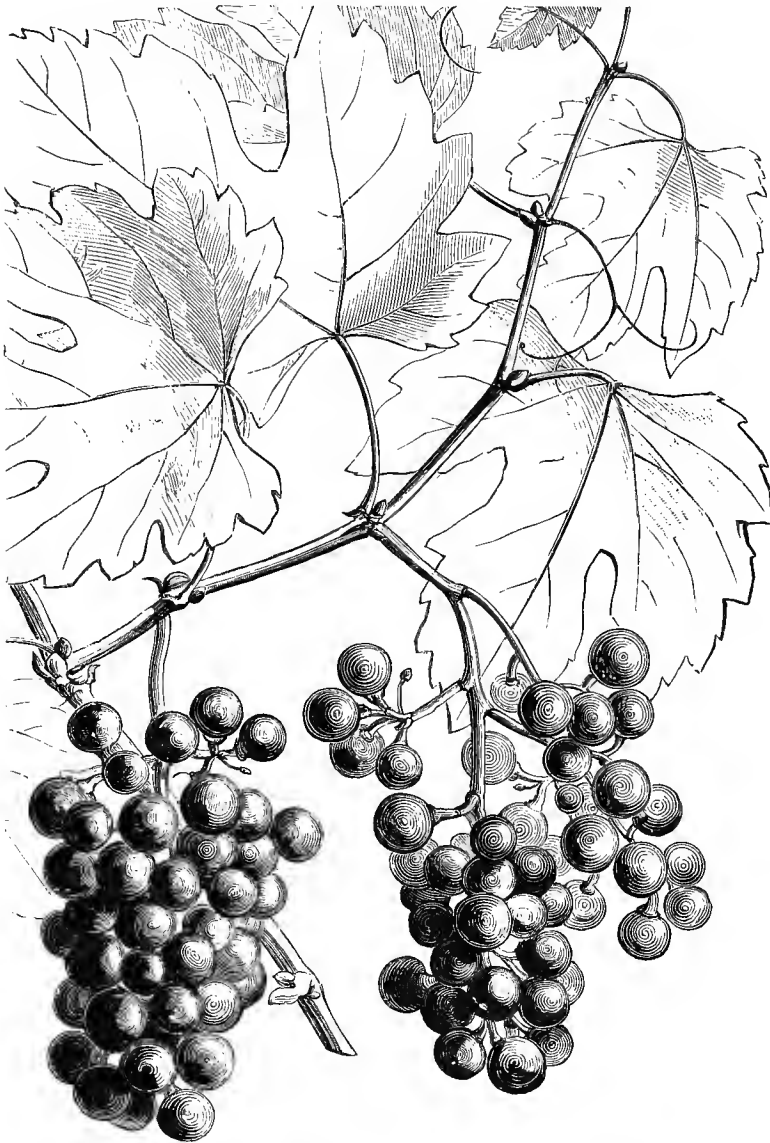


FIG. 175. LEAVES AND FRUITS OF THE WILD VINE (*VITIS VINIFERA*).

Stems and all the green parts slightly downy; when in flower, becoming weaker, with a tendency to twine. Japan, 1850. Half-hardy or hardy perennial.

**VINE** (*Vitis vinifera*). The Grape Vine is found growing wild in the temperate regions of Western Asia, Southern Europe, and parts of Northern Africa, and is generally believed to be a native of that part of Asia Minor to the south of the Caucasus and of the

**Vine—continued.**

says was planted in 1758. This is stated to be the oldest Vine in England, and to be the parent of the still more celebrated Vine at Hampton Court, which was planted in 1769, and now covers a space of about 220 square yards. Of more modern Vines, the most remarkable examples are those at Cumberland Lodge, Windsor, which annually produce about 2,000lb. weight of Grapes; that at Mr. Kay's, Finchley, covering a house 89ft. long by 18ft. wide; and that at Manresa Lodge, Roehampton, filling a house 224ft. long, the stems extending to 1,365ft.

The Grape Vines of Europe are all varieties of *Vitis vinifera*; whilst those of America belong to *V. Labrusca*.

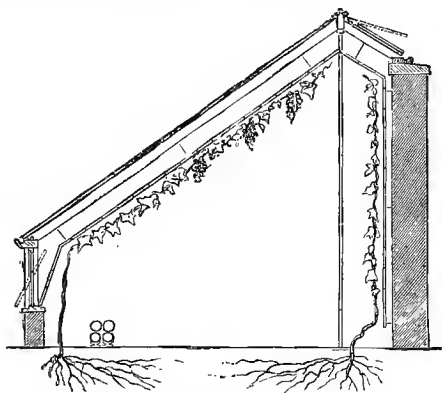


FIG. 176. SECTION OF HIP-ROOFED VINERY.

**VINERIES.** In regard to these, Vines, it may be remarked, are extremely accommodating, and will grow in any structure sufficiently exposed to the influence of light and air—an essential point. For certain purposes, however, it has been found that some forms are more suitable than others. Thus, for the growth of very early grapes, lean-to houses (see Fig. 181) are most approved. They are naturally warmer, the back wall affording considerable shelter, and require less fixing, &c. For general purposes, the three-quarter span or hip-roofed viney (see Fig. 176) is much approved, combining the merits of the lean-to, facing the South, with those of the span-roof, generally erected facing East and West. The commonest form, and that most generally erected by the

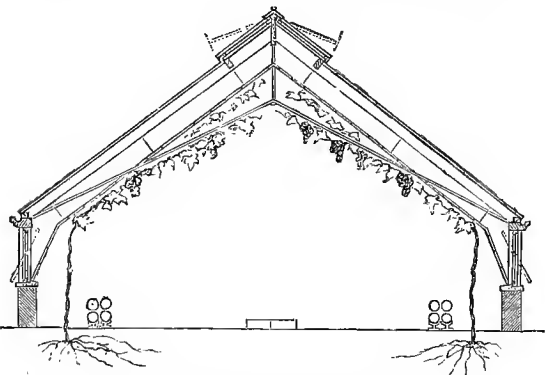


FIG. 177. SECTION OF SPAN-ROOFED VINERY.

growers for market, is the span-roof (see Fig. 177). Vineries may be of any size that circumstances allow for

**Vine—continued.**

general cropping, but for early grapes, where much fire-heat is required, as well as for keeping late grapes, moderate-sized houses are desirable; and low houses are to be preferred to high ones for general utility and working purposes.

**Heating.** All structures for the growth of grapes should be efficiently warmed. Artificial heat, in distinction from solar heat, may be supplied either by flues or by hot-water piping. Flues are objectionable on account of the great amount of space they occupy, and the very arid heat they supply, favouring the intrusion of Red Spider, &c. Hot-water is the system now generally adopted. The amount of piping must be regulated by the special requirements in each case. An ample supply is preferable at all times, so as to avoid keeping the pipes at a high temperature, which is injurious.

**Ground Vineries.** The Vine may be grown in a very circumscribed space, and under very diverse conditions. The cottager with his single rod of ground may, by aid of "old Father Sol" and a few squares of glass, supplemented by care and attention, produce his own grapes nearly equal in quality to those of his lordly neighbour, with his costly vineries and gardening skill. Thanks to the introduction of cheap glass, and the examples of such worthy men as the late Mr. Thomas Rivers, Mr. Wells, Dr. Newington, and Mr. Harrison Weir, the success of ground vineries has been thoroughly established.

The magnificent examples of grapes grown in ground vineries by Mr. Weir, consisting of such varieties as Black Hamburg, Muscat Hamburg, Muscat of Alexandria, and especially of Muscat Champion, all of which have been exhibited to the Fruit Committee of the Royal Horticultural

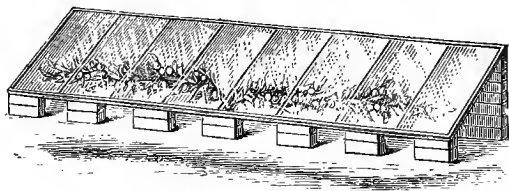


FIG. 178. GROUND VINERY.

Society, proved to be of very superior quality. Fig. 178 represents an extremely simple contrivance. A few plain bricks (or boards) form the back, some 2ft. to 3ft. high, and a simple wall-plate in front, on which the squares of glass are loosely placed, rests on couples of bricks. The structures, however, may be of almost any form, provided the Vine in its growth be thoroughly exposed to the direct influence of the sun's rays. Mr. Harrison Weir prefers a span-roofed structure, 7ft. in length, 2ft. 8in. wide, the sloping sides each 2ft. 8in. deep, and the height in centre, from ground line to ventilator, 1ft. 10in. The ends are of wood, with an air-hole for ventilation, fitted so as to be closed when required. A warm, dry soil, and an open, sunny situation, are of the greatest importance: there would be very little hope of success in a low-lying, cold situation.

The Vines should be planted inside the viney, and trained along the top to a wire or pole going its whole length, and hung somewhat from it, so that the string or fastening may not be tight. The lights should never be taken off, either in summer or winter, for a permanence, or even left off for a single night, unless the weather be very hot, or for the purpose of ripening the wood. The bunches of fruit should be thinned in the usual way, and not so many left as to retard the ripening.

**Vine—continued.**

**Varieties.** Nearly all the cool-house Vines, such as Black Hamburgh, Buckland Sweetwater, Foster's Seedling, Madresfield Court, Muscat Champion, Royal Muscadine, and most of the small Chasselas and Frontignans, may be grown in this way, and, in most instances, with great success.

**PROPAGATION.** The propagation of the Vine, as generally practised in this country, is effected by "eyes." By this term is meant the buds on the ripened shoots of the

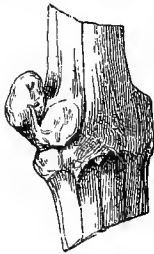


FIG. 179. VINE EYE.

previous season's growth, as represented by Fig. 179. These are cut as shown, about 1in. or more in length, the best-matured wood, having firm, plump buds, or "eyes," being selected. The season best adapted for the operation is during the months of January and February—the earlier the better, so that the plants may have plenty of time to



FIG. 180. VINE EYE STARTED.

grow. A number of small pots or pans should be prepared, and filled with fine soil. A single eye should be inserted in the middle of each small pot, and pressed down until the top of the bud is just level with the surface of the

**Vine—continued.**

soil: in the pans, a number of eyes may be inserted in the same manner, to be potted off singly afterwards. The pots and pans, when filled, should be plunged in a bed having a bottom-heat of about 80deg., and a top temperature of from 65deg. to 70deg., and afterwards gently watered. Many other methods of "putting in" the eyes may be adopted. Great care is required when the buds commence to grow (see Fig. 180), they being extremely liable to "damp off" at this period. As soon as the roots have reached the sides of the pots, the plants should be transferred to larger ones, and plunged in the hotbed, to be repotted again, and so on. Vines may also be layered. This consists in taking a young shoot of a Vine, and pegging it down to the surface of the ground, or on pots; roots are freely produced, every bud becoming a separate plant when severed. In Vine-growing countries the plants are propagated by cuttings—i.e., shoots cut into lengths of from 10in. to 18in., which are frequently planted in their permanent positions at once. Budding and inarching are also practised in various ways. Grafting the Vine is largely adopted where it is desired to introduce new varieties without complete renewal of the plants. The grafting of Vines differs somewhat from that of ordinary grafting—not in the mechanical operation itself, which is practically the same, but owing to the extraordinary flow of sap which occurs in the Grape Vine at the commencement of growth in spring; if any portion of the stem be cut at that time, a very large outpouring of watery fluid takes place, termed "bleeding," which prevents union. It is necessary to defer the operation until this flow ceases, which will be when the first few leaves have become properly expanded. Common whip-grafting is the simplest and best method to adopt. At whatever part of the stock it may be determined to affix the scion, it is necessary to leave a growing shoot and some leaves above this point, for the purpose of drawing off by evaporation the superabundant water that will have to be disposed of, and likewise for forming and perhaps drawing up nourishment for the supply of the scion itself until a union is effected. The scions being affixed, they should be tied securely, and covered with some sort of grafting wax in preference to either clay or moss. See also remarks under POT CULTURE.

**CULTIVATION UNDER GLASS.** The Grape Vine is a remarkably free-growing plant, and naturally requires a great amount of nourishment in the matter of soil, manure, and water, for its successful cultivation. Vine borders require to be constructed with some degree of care. Low-lying situations, with damp, cold subsoils, should be avoided; ample drainage is most essential. The best situation for a Vine border is on a gentle slope, where the ground is drained naturally. In such a situation, if on a gravelly subsoil, little artificial drainage is required. It is well, however, when forming a border, to put in from 1ft. to 1½ft. of broken bricks, &c., as drainage; and in many cases it is expedient to concrete the bottom below this, so as to prevent any possibility of the roots descending. As to the sizes of the border, the roots of Vines travel (if allowed) a great way, and it is necessary to restrict their passage. An ordinary-sized border should correspond to the width of the house; thus, a vinery 16ft. wide may have a border 16ft. wide, and so on. A good practice is to form the border both inside and outside, the front wall being built on arches, so as to allow the roots to go either way (see Fig. 181). The depth of a Vine border should range from 2ft. to 3ft., and need never exceed the latter figure.

**Soil.** The soil best suited for Vines is a fibry, calcareous, yellow loam—that is, the top spit, or turf cut 3in. to 4in. thick, from some old pasture land. This may vary greatly, from light, sandy loam to that of a clayey nature. Chop the turfs roughly in pieces, and to five or six cubic yards add one yard of old lime

**Vine**—*continued.*

rubbish or broken bricks, a small portion of charcoal, wood ashes, or burnt soil, and about 2cwt. of  $\frac{1}{2}$  in. ground bones. These ingredients, well mixed, will constitute the main body of the soil to be used, modified in proportions according to the character of the loam. If the loam used

**Vine**—*continued.*

the soil, but also for the prevention of evaporation, whereby a greater and more constant degree of humidity may be maintained. Covering Vine borders, excepting where very early grapes are required, is unnecessary. Watering is one of the most important operations; per-

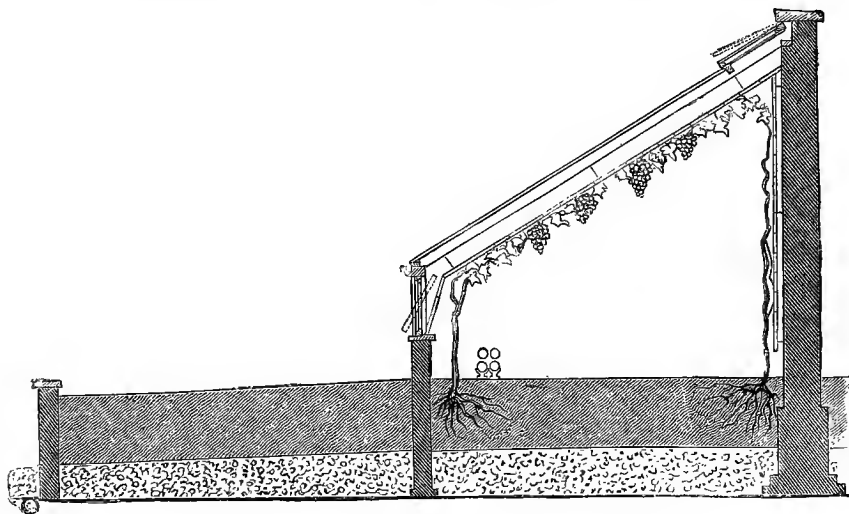


FIG. 181. SECTION OF LEAN-TO VINERY AND OF VINE BORDER.

be of a sandy nature, less of the lime rubbish will be required, as the main object in using this is to give porosity to the soil. The top-dressing of Vine borders is of great importance, and should be attended to every season; the greater the quantity of fresh soil that can be given, the better, especially after the Vines have got into heavy croppings. The soil used for this may be of a somewhat richer character than that recommended for the formation of the border. As much of the old soil should be taken away as can be afforded, and new soil added; or, if the soil cannot be removed, a dressing of some kind of manure should be given, and lightly forked into the border before the Vines commence to grow, in spring.

**Manures.** For the growth of Vines nearly all soils require the addition of some fertilising ingredients—some kind of manure. Farmyard manure is frequently used; but, as this rapidly decays, its influence is soon exhausted: it can only be recommended for mulching or top-dressing. Bones, as containing phosphate of lime, constitute one of the best manurial ingredients for mixing with the soil; being slow to decay, they continue to afford sustenance for many years. Large, unbroken bones are next to useless. Bone-meal, dissolved bones, and horn-shavings are all valuable ingredients of a similar character presented in a more readily available form, and, consequently, more immediately effective. Potash manures are of special value to Vines: a mixture of  $\frac{1}{2}$  cwt. of superphosphate to 1cwt. of nitrate of potash, applied at the rate of 1lb. to the square yard, has been found highly beneficial. A very excellent prepared, or what is termed “artificial,” manure, now largely used, is Thomson’s Vine Manure. Mulching is very necessary in hot, dry seasons, not only as a means of enrichment to

haps more Vines are ruined through want of water than from any other cause. During the growing season, Vines can scarcely receive an over-supply. Inside borders require special care and attention in this respect, as they receive no benefit from the rains, and are directly and entirely under the control of the cultivator. When the fruit is ripe, a somewhat drier condition should be maintained, but it is not desirable to allow the soil to become very dry even then.

**Planting.** Vines may be planted at any season of the year, provided all the requisite conditions be fulfilled. October is a very good period, the soil then being generally in good condition: the roots commence to

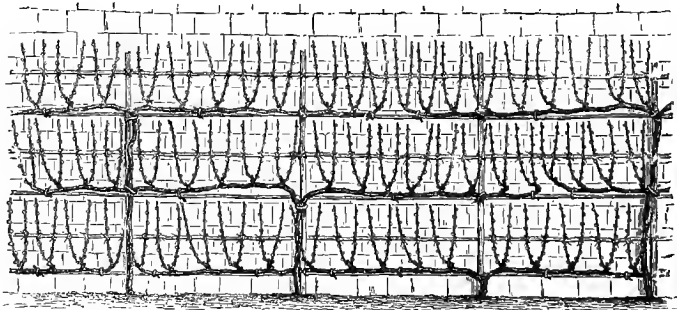


FIG. 182. WALL-TRAINING OF VINES.

grow a little, and get, to some extent, established before spring. January and February are another good season. In planting ripened Vines, care should be taken to shake out all the soil from the roots, and to spread these fully out as near to the surface as possible. Another method

*Vine—continued.*

is that of planting the young growing Vines that have been raised from eyes during the same season; this would take place in May, June, or July. These Vines, if properly attended to in regard to heat and moisture, make the very best of plants. As to the distances apart at which Vines should be planted, this almost entirely depends on the style of training to be adopted. They should never be less than 4ft., to allow the side shoots to develop; in many cases, 5ft. is preferable.

*Pruning and Training.* The Vine is a free-growing, long-lived plant. In its natural state it is of a climbing character, sustaining itself by its tendrils, so that in its cultivated condition it has to be supported in some way. Of the various methods adopted in the training of the Vine, three call for notice here: (1) That practised in the vineyards or wine-growing countries; the young or fruit-bearing shoots are tied to upright poles, 6ft. to 8ft. in height, the plants being about the same distance apart. In other cases they are sometimes pruned into the form of candelabra or other fancy shapes. (2) That adopted for Vines against walls, as practised at Thomery (see Fig. 182). (3) In this country, the Grape Vine is generally trained, in vineries, to trellises fixed at a certain distance from the glass or roof of the house, and is pruned either on what is termed the Spur system, or on that known as the Long Rod system, each of which is subject to all sorts of modifications according to fancy or convenience. The Spur System is that most practised, and may be briefly described thus: The Vines being planted at the proper distances apart, the young plants are cut down to some three or four eyes from the ground; one shoot is trained up in the first season, forming the main stem of the Vine. During the winter season following, this stem is cut back to some 5ft. or 6ft. in length, according to its strength. In the second year, the buds on this stem form shoots on which the fruit is borne, and which are stopped at one or two leaves beyond the bunches, or at a length of 16in. or 18in., the main stem being allowed to extend as before. In pruning, the next winter, these side shoots are cut back to one or two buds, which, being left, form what is termed a "spur" (see Fig. 183), the main stem being pruned back to 5ft. or 6ft. as before. In the third year, one or more shoots are produced from each spur, one of which is selected, trained and stopped as before, and again pruned in winter to one or more eyes; and so on from year to year—in most cases, the Vines filling their allotted space in five or six years. The Long Rod system consists in leaving a number of young shoots or rods to form the bearing shoots, and it is more suitable for some varieties than the Spur system. Vines may be trained to any number of stems or rods, and extended as circumstances may permit, the pruning otherwise being similar.

*Disbudding.* The first operation that requires to be performed each succeeding year, on the commencement of the growth of the Vine, and to which attention must be early directed, is that which is termed disbudding, but which is, in reality, a thinning-out and regulating of the young shoots. This is an operation of very great importance in respect to young Vines, as upon its being properly performed will depend the future form or character of the plant. Disbudding is, in fact, the first step in training, although it is practised much in the same manner long after the form of the Vine is established. The time for disbudding is as soon as it may be perceived that there are more buds than are requisite—say, when the shoots are an inch or so in length; but the sooner it is done, the better. To allow the superfluous buds to develop into shoots, and then to break them off, is a waste of the energies of the plant.

*Vine—continued.*

In disbudding a young Vine, or a leading shoot of the previous year's growth, the first care should be for the top or leading bud, the growth from which should be carefully tied in and preserved from injury, as forming a continuation of the stem. In the disbudding of a young Vine, we also regulate the number of shoots which form the future spurs. To allow space for the full development of the foliage, these side-shoots should not be less than 18in. or 20in. apart. It frequently happens, especially in the case of slowly-grown Vines, that the buds on the stem are more numerous than the shoots required, and in such cases all superfluous buds must be removed—



FIG. 183. YOUNG VINE STEM—PORTION OF SECOND SEASON'S GROWTH.

A, Properly-pruned Spur. B, Improperly-pruned Spur—*ab*, line showing where Cut should have been made.

"rubbed off," as the phrase is. Nothing is more pernicious in Vine culture than the crowding of the shoots and leaves. It is well, therefore, to make a fair beginning, with the proper number, and this is done by disbudding.

Disbudding, also, at times, takes the place of pruning. If the lower buds of a young Vine-rod do not break

**Vine—continued.**

well, it is a good plan to rub off the higher or top buds, which will induce the lower ones to break stronger. Again, if it has been forgotten to prune a Vine or shoot until it has become too late to do so, on account of the risk of bleeding, the neglect may, to some extent, be rectified by a careful rubbing-off of the buds, as soon as they may appear, to the point to which the shoot ought to have been pruned; and then, when the leaves are about fully developed, the sap of the Vine will be sufficiently diverted, and the shoot may be pruned with safety.

*Stopping the Shoots.* This is requisite in order to keep the growth within certain limits, and thus to prevent overcrowding and confusion. According to the Spur system, the main stems being from 4ft. to 5ft. apart, the side shoots, on which the fruit is borne, cannot be allowed to extend to more than 2½ft. in length, otherwise they must overlap each other. The length of the shoots is generally regulated by the position of the bunch, the usual practice being to stop them at two joints beyond the bunch, or at one point beyond, if there is not space for a greater extension. Practically, the longer these shoots can be allowed to grow, the better, as the greater the quantity of fully-developed first leaves, the greater the amount of vigour induced. The operation itself should be performed as soon as the shoot attains the requisite length, and is done simply by pinching off the tip, between the finger and thumb, before it has become fully developed. There is thus scarcely anything to take off, no denuding of the Vine of a portion of its foliage, and no consequent check to its growth. It is a very bad practice indeed to allow the shoots to grow to such a length as to render it necessary to use the knife in stopping them. The tendril forming a part of the bunch of fruit should be pinched off at the same time, also all superfluous bunches.

After this first pinching or stopping, the foremost buds in the axils of the leaves again produce shoots, according to their vigour, which are called laterals, or summer lateral shoots. They should be stopped in the same way immediately beyond the first leaf, and so on again and again throughout the season, as they may continue to grow.

The leading shoot of a young Vine is, of course, to be exempted from this stopping, excepting in so far as relates to the laterals it produces; and these, if space is limited, must be stopped in the manner explained, or they may be trained out in the same way as the proper shoots, and allowed to extend and occupy as much space as may be available. It should always be borne in mind that the greater the quantity of fully-developed leaves and shoots, the more powerful must be the root action, and the more vigorous the plant. The stopping of the shoots of a Vine is not a checking or repressing of its vigour, but rather a guiding or directing of its energies into certain channels of a more desirable and beneficial character than those they would follow if left to themselves.

*Setting or Fertilisation of the Fruit.* If the flowers are not properly fertilised, they will probably fall off, or, perhaps, small berries may be formed: but, as no seed can be produced by reason of non-fertilisation, they, as a consequence, will not grow to their proper size. The impregnating process, in a mechanical point of view, consists of the application of the pollen to the stigma of the flower. It is effected at a very early stage, the little jerk occasioned by the dislodgment of the "cap" or covering causing the pollen-dust to be dispersed. This is generally effected naturally, or without any assistance beyond the maintenance of the proper temperature, atmospheric conditions, &c., and these, of course, vary according to circumstances.

Some cultivators consider it necessary to maintain a very high temperature—from 65deg. to 70deg. by night—

**Vine—continued.**

for the setting of their grapes. This, even if desirable for the forcing-on of the grapes, is not required for the mere "setting" of the fruit. For example, in late houses, and on open walls, the Vines set their fruit quite freely at a lower temperature. Grapes frequently set well at as low a temperature as 45deg. by night. Temperature ranging from 55deg. to 60deg. by night is quite high enough for the mere purpose of setting the fruit, provided there be the desired rise during the day. The setting process takes place in the early morning and forenoon. The temperature by day should always be high by sun-heat. The one great requirement is sunshine, with a fine, mild, bracing atmosphere, so that fresh air in abundance may be admitted to the houses. It is the bracing air, supplemented by the action of sun-heat, which induces the dispersion of the pollen, and by this means effects the setting of the berries.

At times, when sunshine is wanting, it is well to apply artificial assistance, such as "setting" the flowers with foreign pollen, by the aid of a camel-hair pencil. The smallest portion of pollen applied to the stigma will be sufficient; or the plan of smartly tapping the stems of the Vines, so as to shake the bunches, may be adopted, when the pollen will be seen to fly off like a cloud of dust; or, again, recourse may be had to drawing the hand gently over the bunch. The last plan is frequently practised with success amongst the "shy setters."

Certain varieties of Grapes, it is well known, set their fruit freely at all times, and under all sorts of conditions that may be favourable for the Vine. Other varieties do not set freely, whatever may be the reason, and are, in consequence, termed "bad setters." Many and varied conjectures and ideas have been submitted from time to time as to the probable cause of this defect. The pollen and the stigma in some varieties do not ripen at the same time, so that fertilisation cannot take place, and the action of foreign pollen becomes necessary. In other cases the pollen is found to be inert; and some varieties—notably, Black Morocco—have the point of the stigma exceedingly moist, which seems to prevent fertilisation, although this is a condition generally supposed to be favourable for the reception of the pollen.

Attention has also recently been directed to the fact that certain shy-setting Grapes—e.g., Alnwick Seedling, Chaouch, and some American sorts—have the stamens deflexed, or falling away from the stigma, so that they cannot readily be fertilised (the ordinary Vine flower has the stamens erect, and pressing round the stigma). In such cases, the defect of non-setting being due to a structural or constitutional peculiarity, artificial impregnation is the only remedy to adopt.

*Thinning the Fruit.* The Vine is an extremely fruitful plant; so much so, that were the whole crop of the bunches produced by it allowed to remain, the plant would soon succumb through over-fertility. It is impossible to state how many bunches, or what crop, a Vine should carry, so much depends upon its health and constitution, on its surroundings, and on the subsequent management accorded it. A rule something like this might be laid down: According to the surface of properly-developed leaves, &c., so should be the crop of fruit taken. We know we must have so many good leaves for every pound of fruit. The greater the amount of properly-developed foliage allowed, the better. If we bear in mind that all the colouring and sweetening matter, which goes to the perfecting of the berries, has first to pass through and be elaborated by the leaves, we shall see that without a certain amount of healthy leaf-surface good fruit cannot be produced. A Vine with weak, sickly foliage cannot produce or bear much fruit, and a plant whose foliage gets destroyed by Red Spider, &c., is in exactly the same condition.



**Vine**—*continued.*

One bunch on each spur would be considered a heavy crop; an average of 1lb. to every foot of rod is about the general quantity left, and is considered an ordinary crop. In thinning the bunches of such free varieties as the Black Hamburgh, every second bunch on each spur should be cut off before the flowers open, and all others which it is desirable to remove as soon as the grapes are set. The thinning of the bunches, as well as of the berries, should be done early. It is a great waste of power to allow that to develop itself which is not required, and which it is known must be cut away; therefore, as soon as the berries are fairly set, thin out—that is, cut off—the supernumerary bunches at once, and commence the thinning of the berries.

The thinning of the berries—or grape-thinning, as it popularly called—is a delicate and somewhat tedious operation. To be expert at this work requires considerable practice. For ordinarily well-set Black Hamburgh grapes, about one-third the number of berries require to be cut out; such varieties as the Royal Muscadine do not require to be so severely treated. It seems to the uninitiated a great sacrifice to cut away so many, the thinned bunch appearing quite a skeleton; but as each berry, when fully grown, should be nearly 1in. in diameter (oftentimes more), there is nothing gained by leaving more than space actually permits. In thinning, first trim the bunch, if required, into proper shape, then continue by cutting out all the inside berries, next all the small berries, and then the side berries. The expert hand will cut these off two or three or more at a time. It will now only remain to regulate the growing berries to the required distance apart.

With larger bunches it is frequently desirable to tie up the shoulders, and so spread the bunch out, or to loop them up to the trellis with S-shaped pieces of thin wire of the requisite length, or to prop the shoulders up from underneath with little bits of wood: the berries, as they swell, lift each other up, and the clusters thus remain compact. Care should be taken not to make the bunches too thin. They should be so thinned that, when ripe and cut, the bunch or cluster may remain firm and compact, whilst every berry has been allowed to develop itself freely to its full size. As a general rule, the Vines require to be gone over twice before the stoning period, and once after, during what is termed the "second swelling," in order to remove all small berries, and otherwise regulate the bunches. In the great Vine-growing establishments, the major part of this work is performed by women and young persons.

**FORCING.** Since the introduction of orchard-houses, ground vineries, and other unheated structures for the cultivation of the Vine, this term, at one time very expressive of a definite condition, has become nearly obsolete. Any means that may be adopted for the forwarding of the growth of a plant to a greater extent than would take place naturally, may be termed forcing. Heat is the motive power. Some Vines are forced in spring, to induce them to commence growth early; others require forcing in autumn, to ripen their fruit. The Vine growing in an unheated orchard-house—that is, not heated artificially—is forced by solar heat to a certain degree.

Vines may be forced into growth, and to bear fruit at any season of the year, provided that the wood is properly ripened. Early-forced Vines of one season force more readily the following year, and established Vines always more easily than young ones. To secure early grapes, say in April, the Vines should be started into growth in November. The time required from the commencement of growth to the ripening of the fruit is, for the Black Hamburgh, about five months. Thus, Vines started in March should have fruit ripe at the end of July, and

**Vine**—*continued.*

those coming naturally into growth by the end of March, in August and September. The Muscat of Alexandria, Gros Colman, Alicante, Lady Downes' Seedling, and other late grapes, require nearly six months to ripen thoroughly. If, say on January 1, we take as an example a vinery from which ripe grapes are required to be out in the month of June, the management or treatment necessary to secure this end may be stated in general terms, as follows:

**Temperature.** At the commencement, a night temperature of about 60deg. will be sufficient until the Vines have started growing. The heat should be gradually raised to 70deg. by the time they come into flower. When the grapes are fairly set, a lower temperature may be maintained until after the stoning period, when, if necessary, a rise of a few degrees may be allowed. When the grapes commence to colour, the temperature may be lower, but fire-heat is nearly always required, in order that a bracing atmosphere may be maintained. For day temperatures a rise of 5deg. by fire-heat may be allowed in dull, cold weather, and of 10deg. or more if by sun-heat, up to 80deg. or 90deg., as the season advances. In very cold weather, however, it is better to have a lower temperature than to maintain a high one by overheated pipes.

**Ventilation.** The object to be attained by ventilation is not merely the maintenance or regulation of the temperature, but also the admission of fresh air. The night temperature is mostly regulated by the amount of artificial heat applied; but the day temperature, or amount of sun-heat, is regulated by ventilation. In Vineries a little air should be admitted by the top ventilators early in the morning, or as soon as it may be observed that the temperature has risen or is rising above the required point, and this air should be gradually increased as the day and the temperature advance; and soon should be reduced in like manner, endeavouring, if possible, to shut up early enough to secure a slight rise in the temperature after doing so. Closing early at all times, and "bottling up," as it were, the sun's warm rays, is desirable. As the grapes begin to colour, air must be freely given, both by day and by night.

**Moisture.** This, in its relation to the atmosphere, is of great importance to the healthy progress of the Vine. A close, moist atmosphere is necessary to induce the buds to break freely, and afterwards to assist in supplying nutriment to the Vines through the leaves. Again, moisture is requisite to prevent the destruction of the leaves by insects.

From the commencement, then, a humid atmosphere must be maintained; the higher the temperature, the greater the evaporation, and the greater the amount of moisture required. When the Vines are started, they should be syringed regularly several times a day, especially if the weather be bright and warm, beginning as soon as it is perceived that the temperature is rising, and so on, varying as to time according to season, &c. This treatment may be continued until the Vines come into flower, at which period a somewhat drier atmosphere should be maintained until fertilisation has taken place. Syringing must from this time be discontinued: on account of the lime present in almost all water, the berries become spotted and soiled by its use. Every portion of the house and border, however, should be freely watered at all times, and the atmosphere kept well charged with moisture.

When the grapes are beginning to colour, a somewhat drier atmosphere is required; and by the time they are ripe, the air should be kept as dry and bracing as possible. After the grapes are cut, if it be during the growing season, the syringe should be again freely employed to thoroughly cleanse the leaves and wood, and its use continued until they ripen off.

*Vine—continued.*

**POT CULTURE.** The growing of Vines in pots is of a twofold character: first, that of producing plants for planting-out, subsequently to be grown as permanent Vines; and secondly, that of producing plants for fruiting in pots. Some cultivators grow the Vines obtained from eyes "struck" in early spring to their "fruiting state" the same season. Others strike the eyes, and grow the plants on so far, and the following year cut down, re-pot, and grow on again, thus occupying two years in producing a similar result. The one-year-old plants, if properly grown, are generally considered the better; but they are only produced under very favourable conditions, requiring an excessive amount of care and attention, and cost, possibly, more than the two-year-old plants, or "cut-backs," as they are familiarly called.

**Potting.** Liberal pot room must be provided, so as to grow the Vines quickly; therefore, as soon as it is found that the roots have reached the bottom or sides of the pot, re-pot into a 5in. or 48-sized pot, from this, immediately the roots have again reached the bottom, into an 8in., and from this into a 10in. or 12in. pot, which is called the fruiting-pot. This last size will be found quite large enough for all practical purposes. Plants that are intended to be grown the second year need not be potted into larger than 8in. pots. After the last shift, which should not take place later than the beginning of July, when the pots get stored with roots, they should be liberally top-dressed from time to time; this top-dressing will be found to get filled with fibry roots.

**Soil.** The best, fresh, fibry loam that can be procured, with the admixture of broken charcoal, and a little bone-dust and decayed manure, should be chosen for the first potting; the rougher the condition in which the soil is used, the better. The pots must be carefully and efficiently drained. For the second and third pottings, the soil may be somewhat richer. Top-dressings should consist of half-rotted manure mixed with the soil, together with some horn-shavings or bones. Care must be taken, in potting, to have the soil of the same temperature as that of the houses in which the plants are growing, and the Vines should be potted in the same place if possible, so as to prevent any possibility of chill from exposure, the check to their growth arising therefrom being extremely injurious at this stage.

**Watering, &c.** Abundance of water is at all times necessary for growing Vines. They should be syringed several times a day, and the atmosphere kept continually charged with moisture. When the fruiting-pots are full of roots, liquid manure should be frequently applied.

**Temperature.** Vine-eyes, on being struck, should be plunged in a bed having a bottom-heat of 80deg., and an atmospheric temperature by fire-heat of 65deg. or 70deg., which, by sun-heat, may be allowed to rise to 90deg. or 100deg. Too much sun-heat can scarcely be indulged in, if the atmosphere be plentifully charged with moisture. The same regulations as to temperature apply throughout the season, or until the Vines begin to ripen. Bottom-heat is not requisite when the plants attain a large size.

**Training, &c.** As the young Vines grow, they require to be staked, and to have the tendrils and lateral shoots pinched off as they are put forth. The leading shoot should not be stopped until it has grown to the required length. When the Vines have arrived at their full length, from 6ft. to 10ft. as the case may be, they must be stopped, and the laterals, as they appear, kept closely stopped also to the first leaf, in exactly the same manner as recommended for permanent Vines. When the canes are ripened, which may be in November, they should be at once pruned; that is, all the lateral spurs should be cut off, and the stem cut down to the length required—from 5ft. to 8ft., according to its strength.

*Vine—continued.*

The young Vines, whilst growing, should be kept as close to the glass as possible; and as they increase in length, a good situation for them is along the front of a low pit or house, training the rods to a trellis against the roof. In this manner the whole of the leaves, &c., are fully exposed to the sun's influence, and well-developed fruiting-buds are produced the entire length of the rod.

**Ripening the Canes.** The ordinary method, towards the end of the season, when the Vines are fully grown and show signs of ripening off, which they will do naturally, is to give gradually more air and less water, and after a short time to allow them to be fully exposed or removed to the open air. The plants, however, should never be allowed to flag or suffer from want of water.

**Production of Fruiting Vines in Two or more Years.** The treatment required is practically the same as that recommended for the one-year-old Vines, with this difference, that, instead of beginning with "eyes," young plants have to be dealt with. In winter, these young Vines should be cut down to one or two eyes or buds; and in January or February, the pots should be placed in heat. As soon as the eyes have started, the plants should be repotted, the old soil being shaken out and new soil applied. The smaller the pot that will contain the roots, the better. The plants should be plunged in bottom-heat, and repotted as required, and as already directed. These "cut-back" Vines, having somewhat the start of the "eyes," generally form the largest and strongest plants. They may be, and sometimes are, grown to a great size, and potted into the largest pots, when they produce enormous crops, some twenty-five or thirty bunches on a single plant, notable examples of which have been often exhibited by Messrs. Lane and Son, of Berkhamsted. Some of these large Vines may be fruited in pots for several years.

**Treatment of Fruiting Vines.** The forcing of pot Grapes may commence in November, or at any subsequent period. Those selected for early forcing should be the first ripened, and the canes should have been pruned quite a month before their introduction to heat, otherwise they may bleed. The use of well-ripened canes is a most important matter for early forcing.

A low house or pit is the most suitable for pot Vines. They have simply to be placed on a shelf along the front; or the pots plunged in a slight hotbed. The temperature at first should not exceed 50deg. by artificial heat, but must be increased, as the eyes break and begin to grow, to 60deg., and about the flowering period to 70deg. or thereabouts. With sun-heat the temperature should range much higher; but in this respect the treatment of pot Vines as regards general management, atmospheric conditions, ventilation of the house, &c., is exactly similar to that of plants grown in the ordinary Vinery.

After the Vines are placed in heat, water must be very sparingly applied for some time, until the roots commence growing, otherwise the soil will become sour and the roots will decay: it is better to allow them to be a little dry than otherwise. As the plants come into full leaf, a copious supply of water will be required. Whilst the fruit is ripening, extreme care is necessary—especially if the crop be a heavy one—to maintain the Vines in a thoroughly healthy state. Careless watering will destroy the best of crops; more failures are attributable to this cause than to any other. Liquid manure should be frequently given to the healthy plants.

Re-potting is seldom required. The best time to re-pot is about the period of the setting of the grapes, the roots being then in an active state, so that they soon take to the new soil. Top-dressings of soil mixed with horn or bone shavings, &c., should be freely applied.

As to their cropping capabilities, a strong Black Hamburgh Vine, in a 12in. pot, may be allowed to bear 8lb. or 10lb. of grapes—from six to eight fair-sized bunches.

**Vine—continued.**

A Royal Muscadine Vine should bear from ten to twelve bunches; but this is dependent upon the strength and health of the plant.

The ordinary or utilitarian method is to train Pot Vines to a fixed trellis, the plants being placed about 2ft. apart, so that when the side shoots with the fruit, &c., are trained out, the whole trellis may be covered. Another mode is to twist the canes coil fashion round two or three strong



FIG. 184. FRUITING POT VINE.

stakes placed in the pot (as in Fig. 184), thus giving the plants, when fully grown, the appearance of columnar bushes. Another mode is to train the shoots so as to form a sort of umbrella-shaped head, with the bunches hanging round. These latter are all more or less graceful and ornamental.

**Varieties.** The varieties best suited for fruiting in pots are the free-bearing kinds, such as Alicante, Black Hamburgh, all the Chasselas group, Foster's White Seedling, Madresfield Court, Royal Ascot, and Royal Muscadine. The Muscat of Alexandria is difficult to cultivate in pots, and Gros Guillaume scarcely shows any fruit at all.

**CULTIVATION ON OPEN WALLS.** Grapes were, at one time, much more extensively grown in the open air in this country than they are at present. This may principally be ascribed to the following causes: (1) The introduction of cheap glass, whereby structures for the cultivation of the Grape Vine with a considerable degree of success, may be erected at a moderate cost. In olden times, the seasons were not always propitious and suitable for Vine-growing any more than they are at the present day, although we read accounts of some very fine fruits having been grown on open standards in 1818. (2) The Mildew, the intrusion of which scourge to the Vine, in the year 1847, has rendered its cultivation in the open air in this country extremely precarious. Although sulphur is well known as a remedy, its application to Vines in the open air is not so easy to accomplish, and, therefore, the results are not so effectual as could be desired. It is very seldom now that outdoor grapes entirely escape this malady. (3) A series of cold, sunless seasons, in which the outdoor

**Vine—continued.**

grapes have seldom ripened, so that their cultivation has gradually come to be nearly abandoned. If a little more attention to the proper culture of the plant, and to the thinning and taking care of the fruit, were given, no doubt better results would follow; and it seems a pity we do not see Vines more frequently adorning the walls of our cottage homes in the more southern parts of the country. There the Grape Vine would be not only ornamental but useful. As a plant it is perfectly hardy, and it grows freely. In spring the young shoots are sometimes injured by late frosts, and in cold seasons the wood does not ripen thoroughly, but it is the fruit that is tender, and that only in so far as it generally requires more heat than our climate affords to ripen it.

**Soil.** The Vine will grow in any good garden soil which is freely exposed to light and air, and well drained; the more of a loamy character it has, and the fresher it is, the better. Before planting, the soil should be well dug or trenched to a fair depth, and some well-decayed manure, ground bones, &c., applied.

**Position.** This must be warm and sheltered—a wall facing the south, or a roof sloping in the same direction. Any other aspect is useless.

**Planting** should be done early in the autumn, so that the roots may get into action before winter.

**Pruning and Training** must, to a certain extent, be very similar to the practice adopted under glass. Vines to be trained to single stems should be planted about 2ft. apart, and pruned on the spur system. It is preferable, however, to allow Vines on open walls to cover a greater space, and to have many stems or branches. These may be trained in an upright direction, at about 1½ ft. apart, and may be pruned on the spur system; another method is that of training the stems in a horizontal direction. Thus, at the first pruning, the Vine is cut down to a height of about 1½ ft., and three shoots or stems are trained up the first year. At the winter pruning, one of these stems is trained out horizontally to the right, the other to the left; these, being pruned according to their strength to 4ft. or 5ft. in length, form the first or lower tier of branches on which the fruiting shoots or spurs are to be produced. The third shoot is trained upright; if strong, it may be pruned to 4ft. or 5ft. long, and the following season one or more side branches may be added in a similar manner, the distance apart being 18in. or 20in. The fruit-bearing shoots may be about 1ft. apart, and should be nailed in on the upper side of the stems only. Vines so trained may be extended to any distance, and pruned in winter in the usual manner. Disbudding must be carefully attended to, and the bearing shoots regularly stopped at one leaf beyond the fruit; and all the lateral shoots subsequently produced must be carefully removed.

To secure the best results, the bunches and berries should be carefully thinned, and, in the case of white grapes, fully exposed during the ripening period to the rays of the sun. If long, straggling bunches are produced, it is better to shorten them, as short, compact bunches ripen best.

**Varieties.** The greater portion of the Sweetwater section, with a few of the smaller Muscats, will be found more or less suitable for cultivation in the open air. In France the variety met with is invariably the Chasselas de Fontainebleau, which in this country is known as the Royal Muscadine. As grown in France, with the beautiful cinnamon-russet colour, it is very rich and pleasant. The Royal Muscadine is, at the present time, the leading grape for outdoor culture. A much better variety, not yet sufficiently well known, is the Chasselas Vibert, which produces larger berries, and ripens about a fortnight earlier, than the Royal Muscadine; Ascot Citronelle, Black July, Espiran, and Grove End Sweetwater, may also be recommended. In some

**Vine—continued.**

warm seasons, the Black Hamburg ripens its fruit very well.

**KEEPING THE FRUIT.** Grapes, unlike most other kinds of fruit, will keep in a ripened state, and in a usable condition, on the plant for a long time, a certain amount of nourishment being necessary to the maintenance of the berries in a properly fresh and plump condition. If severed from the Vine, they soon shrivel or decay, unless the stalks be placed in water, or sustenance be provided in some other way. Properly ripened, and placed under favourable circumstances, grapes will keep in excellent condition for a long time. Some varieties possess this keeping property to a greater extent than others. The fact of being thus able to keep ripe grapes prolongs the season of their use, and assists in maintaining a continuous supply.

The cultivation of the Vine in glass-houses is the primary means by which we are enabled thus to keep its fruit. Grapes grown in the open air cannot be preserved for any length of time on account of the weather, but in vineries they are under control. Houses, therefore, that are required for late or keeping grapes should be so constructed as to meet the special requirements of the case; and these are an equable temperature and a dry atmosphere, which are maintained by proper heating powers and thorough ventilation.

Grapes that are required for late use should be ripened by the end of September. When the fruit becomes ripe, the most active period of the growth of the Vine is past; but it is not well, although a very old custom, to keep the borders and the roots dry. The artificial drought is injurious to the roots, which are still in action, and not beneficial to the fruit, for the longer the foliage can be maintained fresh and green, the better the grapes will keep. Constant supervision is necessary, and great care should be taken to remove any decaying berries, keeping the temperature as near 45deg. as possible.

Ripe grapes may be kept in good condition on the Vines until March, or later if carefully shaded from the sun, and a cool, dry atmosphere be maintained. If allowed to hang until the rise of the sap, the operation of pruning is likely to be injurious to the Vines.

**Bottling Grapes.** Grapes may be cut from the Vines, and, having their stalks placed in bottles of water, may be kept in a fruit-room, or other suitable apartment, in almost as perfect a condition as those that are allowed to hang on the Vines; and where the quantity is limited, this can be done at much less expense. Further, they may thus be preserved to a later period than it is possible to keep them on the Vines. This is a method of keeping grapes that has been for some time adopted in France, although it was scarcely known in this country until brought under notice by Mr. Robinson, in his "Parks, Promenades, and Gardens of Paris," in 1869. It is now, however, adopted, with modifications, in many establishments in this country. The originator of the system was M. Rose-Charmeux, of Thomery, who had a small room in his house fitted for the purpose, from which light and air were, as far as possible, excluded.

One of the best examples of this method is that used at Ferrières, near Paris, the seat of Baron Alphonse de Rothschild, where M. Bergmann, the excellent gardener, has a grape-room specially fitted for the purpose, and in this all the grapes are placed as they become ripe. Fig. 185 is an illustration of his mode of fixing the bottles, and Fig. 186 shows the arrangement of screens or partitions adopted within the room for the convenient stowage of the bottles when in use.

The ordinary fruit-room will not answer for this purpose; the grapes cannot be kept with other fruits,

**Vine—continued.**

as they require special provision made for them. A thoroughly dry, close, dark room, wherein an equable temperature of 40deg. to 45deg. can be maintained, is what is required. Dryness is the first consideration, so, if a separate room has to be constructed, it should be built with hollow walls and a double set of doors, in order to counteract the effects of fluctuations in temperature and moisture. The grapes intended to be thus kept should be cut with a considerable portion of the shoot attached, and the end of the shoot placed in a

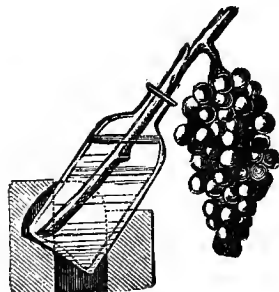


FIG. 185. MODE OF FIXING BOTTLES FOR GRAPES.

bottle filled with pure water. Opinions differ as to whether the fruit is deteriorated in quality by being thus kept. It is obvious that support is derived from the water, and this subsequent absorption of water can scarcely act otherwise than to reduce the amount of saccharine properties in the fruit.

The best late-keeping Grapes are those varieties having thick skins, viz.: Alnwick Seedling, Gros Colman, Gros Guillaume, Lady Downes' Seedling, Muscat of Alexandria, Trebbiano, West's St. Peter's, and White Tokay. It is



FIG. 186. SECTION OF PORTION OF UPRIGHT FOR SUPPORTING BOTTLE-RACKS.

difficult to keep Black Hamburg Grapes in good condition on the Vines after Christmas; but if cut before that time, and placed in bottles, they may be had in a sound state during the month of January.

**DISEASES, &c.** These have been far more studied in France and in other Continental countries, than they have been in England, since in the latter country Vines are more especially luxuries, grown in greenhouses; while on the Continent they are among the most valuable of cultivated plants, and their destruction from any cause may mean ruin to their cultivators. Hence, the greater part of our information with regard to the diseases of Vines,

**Vine—continued.**

and the appropriate treatment for each, is due to the researches of French and German biologists. The causes of disease are various, including excess or defect of warmth, moisture, exposure to light, and food, defective ventilation of vineries, attacks of Fungi and of insects and other animals. Two diseases to which Vines are liable have been already treated of under **Shrivelling** and **Sun-burning**. The former is due to insufficient supply of water, either because of its deficiency in the soil, or because of the roots failing to transmit a proper amount to the leaves and fruit. The latter may be due to the roots being too few for the necessities of the plant, or to coldness of the soil after the air of the vinery has induced active growth in the young shoots and leaves. The plants may also suffer, in ill-ventilated vineries, from "sun-burning" of the leaves, small portions becoming brown and dry, in the manner described under **Sun-burning**.

**Bleeding.** A term applied to an overflow or outpouring of watery sap, although there is no real analogy between this flow of water and the efflux of blood in animals. The Vine is furnished with an enormous supply of this watery sap, which flows very freely, and with great force, shortly after growth commences, until the plant gets into full leaf. The cause of bleeding is late pruning or otherwise cutting the Vine at this period. This loss of sap is sometimes excessive, and is then injurious to the Vine. There is no ready means of arresting the flow when once it has commenced. To avoid its occurrence, Vines should be pruned early.

**Shanking.** One of the most perplexing maladies that affect the Vine. The term is used to denote the drying-up or withering of the stalks of the bunches or berries; the berries that thus shank, or lose the vitality of their stalks, become intensely sour, and never ripen. Sometimes, it is only a few berries; in other cases, it is the whole bunch, or maybe the entire crop. Many and varied opinions as to the causes of shanking have been advanced. In a broad sense, it is, no doubt, the result of some overstrain, some bad condition of, or injury to, the feeding or respiratory organs of the plant—either the foliage has been in some way injured or prevented from performing its proper functions, or the roots have got into bad condition, and cannot perform theirs; or it may be due to a combination of both these causes. As to the more immediate causes, we note the following: Over-cropping; the destruction of the foliage by Red Spider or other agency; the stripping-off of a great quantity of leaves at one time, as is frequently done by those who neglect timely stopping; chills, or sudden changes of the temperature of the house; the roots getting into a cold subsoil, or the border becoming wet and soddened, &c.; planting in borders composed of too rich materials; excessive dryness at the roots, such as to cause injury to these organs, &c.—all of which should be avoided.

**Adventitious or Air Roots.** These are so called from their being produced on the stem of the Vine, and suspended in the air like so many threads. They are of the same character as the proper roots, only requiring to be brought into contact with the soil to become such. Air roots are sometimes produced in great profusion from every part of the stem, frequently attaining 1 ft. or more in length, and so give the Vine a strange appearance. There is no particular harm in these adventitious roots, *per se*, but their presence betokens a want of proper action on the part of the true roots running naturally in the soil. They are a sign of bad health, and are frequently the precursors of shanking; they give evidence that the proper roots are not in a condition to supply the great demands of a large expanse of foliage, &c., and that, aided by a warm, moist atmosphere within the house, Nature is trying to supply this want. Close warmth and moisture will induce the formation of such roots from Vine-stems

**Vine—continued.**

at any time; but if the true roots in the border are in a perfectly congenial condition, no air or adventitious roots will be produced in any ordinarily well-managed vinery. They are, in short, mainly the result of the roots being in a cold, wet border. To prevent their formation, or to recover Vines subject to this evil, the amelioration of the borders must be effected, by taking up the Vines, examining the condition of the drainage, renewing it if found necessary, and adding fresh soil. Some varieties of Vines, such as those of the Frontignan class, being of a tenderer constitution, are more subject to the formation of air roots than others. When such roots are produced, they need not be cut off, except for appearance's sake, for they will wither and die as the wood ripens.

FUNGI as causes of disease are treated of under **Vine Fungi**.

**ANIMAL PESTS.** The animals, &c., destructive to Vines are numerous, and the number recorded as hurtful is being added to almost every year in Europe and elsewhere; especially is this the case in America, on which continent animal pests are even more abundant and varied than in Europe. By far the most dangerous insect-foe is the *Phylloxera vastatrix*, of which a full account is given (with a statement of the appropriate remedies to be employed against it) under **Grape or Vine Louse**. This insect has destroyed the contents of many vineries in Britain, and has devastated extensive vineyards in many parts of the Continent. It has been peculiarly destructive in France. Its galls on the leaves are usually very numerous and very conspicuous; but the less prominent root-galls are even more fatal to the Vines. In mid-Europe, a Gall-midge (*Cecidomyia anophila*) produces galls on the leaves not unlike those of *Phylloxera*; but an examination of a gall will disclose the Midge larva in the central cavity. This Midge has not been recorded as British. The stems and branches are liable to be infested by certain species of **Scale Insects** (which see) on the American and European continents, but none have yet been recorded from Britain. Several kinds of Beetles, besides Weevils (see **Vine Weevils**), do considerable injury to the leaves and the young twigs, the more noteworthy being *Anomala Frischii* and *A. Vitis*. They resemble Cockchafers a good deal in form, but are only about  $\frac{1}{2}$  in. long, and are usually satiny or metallic green or blue, with a clay-yellow band round the sides of the thorax. Both they and the Weevils are found more or less frequently in England, and may prove injurious in vineries. When hurtful, their numbers may be reduced by the methods detailed under the headings quoted. Many species of *Lepidoptera* feed on Vines; they are discussed, and remedies are given, under **Vine Moths**. *Aphis* (*Hyalopterus*) *Pruni* is recorded in Buckton's "British Aphides" as living on Vines, as well as on other plants. For appropriate treatment, see **Aphides**.

Among Mites, the worst foe to Vines is the Red Spider (see **Tetranychus telarius**), which sometimes seriously injures the plants at the period of setting of the fruit, when the supply of water is limited, to improve the flavour. When the attack is severe, the leaves may be so seriously injured that the fruit cannot be properly matured. The Mites may be destroyed by the methods detailed under **Tetranychus telarius**. It is important, as a preventive of attacks, to allow the roots a good supply of water, and to keep the atmosphere of the house sufficiently moist while the grapes are forming, the amount of water being reduced only after they are beginning to colour. Another Mite that does harm on the Continent of Europe is *Phytoptus Vitis* (see **Mites**), which causes a dense growth of pale hairs to appear on the lower surface of the leaves, either in isolated patches, or almost covering the whole surface. This growth was formerly regarded as a Fungus, and was

**Vine—continued.**

named *Erineum Vitis*, or *Phyllerium Vitis*. The plants may be only slightly weakened by these growths; but in bad attacks the leaves are unable to do their work in the nutrition of the Vines, which suffer in consequence. The best remedy is picking off, and burning, the diseased leaves.

The last animal to which we shall refer as causing diseases in Vines, is a Nematoid Worm (*Heterodera radiculicola*). This is nearly related to *H. Schachtii* (mentioned under **Nematoid Worms**); and, like that species, it produces small swellings on the roots of very many kinds of plants, including Vines, which become much weakened, or are killed by them. The only remedy, so far as is known, is to carefully remove, and to burn, the diseased plants, so as to prevent the evil from spreading.

**SORTS.** The varieties of Grapes, like those of all other cultivated fruits, are extremely numerous. In its wild state, the Vine exhibits considerable variation, and under cultivation, in the different climates and countries, sorts obtained from seed have been selected as suited to special conditions and requirements. Thus, in some parts thin-skinned, fleshy grapes prevail, and in others, possessing a warmer and drier climate, the thick-skinned varieties preponderate. In the various wine-growing countries distinct classes of grapes seem to exist, whilst those of America belong to a distinct species, *Vitis Labrusca*. It is altogether impossible to estimate the number of varieties existing. In this country, grapes being exclusively grown for dessert, the number of varieties in general cultivation is comparatively limited. Miller, in 1768, describes 18 sorts; Speechly, in 1791, records 50 sorts; Forsyth, in 1810, 53 sorts; Thompson, in the Horticultural Society's Fruit Catalogue, in 1831, records 182 names; Dr. Hogg, in the "Fruit Manual," 1875, describes 143 varieties; and in Barron's "Vines and Vine Culture," 100 varieties are fully described, and mostly illustrated, all of which have fruited in the Royal Horticultural Society's Gardens, Chiswick, and from which the following selection has been made, comprising nearly every variety that is worthy of cultivation:

**Varieties of European Grapes**  
(*Vitis vinifera*).

Until a few years ago, the Grapes grown in this country were entirely selected from other countries, but of late years several remarkably fine varieties have been raised in Britain, by careful hybridisation, and are now being introduced in the wine-growing districts.

**Aleppo.** Fruit variously coloured, some being black, others green or striped with black, small, round, having a singular appearance; flesh soft, sweet, watery; bunches small, loose. An early Sweetwater Grape.

**Alicante.** Fruit quite black, with a thick bloom, large, of a true ovate shape; flesh squashy; flavour somewhat earthy, unless well ripened; skin thick and leathery; bunches large, averaging from 2lb. to 6lb. in weight, very broadly shouldered, conical and regular, closely set; stalk very stout. Late. Very handsome, and easily cultivated.

**Alnwick Seedling.** Fruit black, covered with a thick bloom, large, roundish-oval; flesh firm; flavour strong, sparkling, tolerably rich and sweet; skin thick and tough; bunches large, broadly shouldered, bluntly conical, shy setting. A good, useful, very free-fruited, late Grape, which keeps well.

**Anger's Frontignan.** Fruit purplish-black, with a thick bloom, small, round; flesh firm yet tender, juicy, very sweet and rich, having a strong Muscat flavour; bunches small, tapering, very compact, closely set. Early.

**Aramon.** Fruit purplish-black, medium-sized, round; flesh firm, having a fine, brisk flavour; bunches long-tapering; stalk extremely brittle. Late. Second quality.

**Vine—continued.**

FIG. 187. BLACK CORINTH GRAPES.

Bunch, one-third natural size; Berries, full size.

**Ascot Citronelle.** Fruit pale greenish-yellow, small, roundish-ovate; flesh soft, juicy, very sweet, and richly flavoured. An early Muscat Grape, ripening several weeks before the BLACK HAMBURGH.



FIG. 188. BLACK HAMBURGH GRAPES.

About one-fourth natural size.

**Ascot Frontignan.** Fruit pale greenish-white, small, round; flesh firm, sweet, and with a strong Muscat flavour; bunches small, somewhat loose and straggling. Early.



*Vine—continued.*

**Auvergne Frontignan.** Fruit clear white, changing to amber when fully ripe, medium-sized, round; flesh firm; flavour extremely rich and pleasant; bunches long-cylindrical, closely set. An excellent, early Muscat Grape for growing in cold houses.

**Barbarossa.** See **Gros Guillaume**.

**Black Corinth.** Fruit purplish-red, quite small, round; flesh sweet, juicy, and without seeds; bunches small, tapering. This interesting variety is the Sweetwater Grape producing the currants of commerce, and is largely cultivated in several parts of Greece. It is also known as the **CURRENT GRAPE**, **ZANTE CURRENT**, &c. See Fig. 187.

**Black Frontignan.** Fruit purplish-black, small, round; flesh very firm, with a fine, brisk, rich, sparkling flavour; bunches small, cylindrical, close and compact. An early Muscat Grape, useful for growing in cool houses.

**Black Hamburgh, or Frankenthal.** Fruit deep bluish-black, covered with a fine bloom, large, roundish-ovate; flesh firm, yet tender, juicy, and with a pleasant, rich flavour; bunches medium, ovate, with broad shoulders, compact. A mid-season Sweetwater. This is the chief Grape in cultivation. See Fig. 188.

**Black July.** Fruit deep purple, small, round; flesh sweet, juicy, not rich; bunches small, loose. An early Sweetwater Grape.

**Black Monukka.** Fruit purplish-red, small, long-ovate, or in shape like an acorn; flesh firm, tender, seedless, very sweet and pleasant to the taste; bunches very large, long-tapering. A distinct Sweetwater variety, of Indian origin. See Fig. 189.

**Black Morocco.** Fruit purplish-red, large, long-ovate; flesh very firm, juicy, with a rich, sparkling flavour; bunches large, long-tapering, generally badly set. A handsome, late Grape.

**Black Prince.** Fruit deep bluish-black, with a thick bloom, medium-sized, ovate, always well set; flesh dark, juicy and sweet, but not rich; bunches very long-tapering. A handsome, early, free-fruiting Sweetwater Grape.

**Buckland Sweetwater.** Fruit pale green, becoming almost white when over-ripe, large, round; flesh juicy and watery, with a pleasant, sweet flavour; bunches medium, short, broadly-shouldered. A free-fruiting, mid-season Grape, which sets well.

**Canon Hall Muscat.** Fruit pale straw-coloured, large, round; flesh firm, yet very juicy, with a strong Muscat flavour; bunches large, straggling, very frequently badly set. An extremely handsome, mid-season Grape, but somewhat difficult to cultivate.

**Chaouch.** Fruit clear straw-yellow, medium-sized, ovate; flesh tender, juicy, very sweet and rich; skin thin; bunches of medium size, somewhat loose, often badly set. An early Sweetwater Grape. This is the favourite Grape at Constantinople.

**Chaptal.** Fruit greenish-white, small, round; flesh firm, sweet, watery; bunches long-tapering, rather loose. A very free-growing, mid-season Sweetwater variety, resembling a large form of **ROYAL MUSCADINE**.

**Chasselas de Florence.** Fruit pale straw or nearly white, a great many of them assuming a violet hue, and others a cinnamon-brown, small, round; flesh firm, sweet, and pleasant; bunches long, medium-sized, well set. An early Sweetwater Grape.

**Chasselas Musqué.** Fruit pale greenish-white, changing to amber, small, round; flesh very firm, juicy, and with an extremely rich flavour; skin tender, very liable to crack when approaching maturity—so much so that the bunch becomes a mere skeleton; bunches long-tapering, setting freely. An early Muscat.

**Chasselas Rose.** Fruit clear rosy-red, small, round; flesh firm, juicy, sweet, and pleasant; bunches long-cylindrical, well set. An early Sweetwater; a pretty variety of the **ROYAL MUSCADINE**.

**Chasselas Vibert.** Fruit clear greenish-white, medium, round; flesh firm, tender, sweet, and pleasant; bunches small, compact, well set. A very early Sweetwater Grape.

**Ciotat.** Fruit clear greenish-white, small, round; flesh firm, sweet, and pleasant; bunches small, compact. Leaves very much cut or lacinated (hence the name **PARSLEY-LEAVED GRAPE**, sometimes used). An early Sweetwater Grape.

**Dr. Hogg.** Fruit clear greenish-white, medium, round; flesh firm, very sweet, and with a rich, Muscat aroma; bunches long-tapering, setting well. Mid-season.

**Duchess of Buccleuch.** Fruit greenish-white, changing to yellow when highly ripened, small, round; flesh tender, juicy, exceedingly rich, and with a strong Muscat flavour; bunches very long, cylindrical, well-set. A mid-season Grape.

**Duke of Buccleuch.** Fruit greenish-yellow, very large, round; flesh tender, very juicy, sweet, and exceedingly rich; bunches medium, short-ovate. An early Sweetwater Grape, somewhat difficult to cultivate.

**Dutch Hamburgh.** Fruit deep purplish-black, with dense bloom, very large, round; flesh coarse, and harsh in flavour; bunches medium, short, broadly shouldered, often setting imperfectly. A handsome, mid-season, vinous variety.

**Dutch Sweetwater.** Fruit clear greenish-white, medium-sized, round; flesh firm, juicy, sweet, and pleasant; bunches short, small, often badly set. An old, early Sweetwater sort, suitable for open-air culture.

*Vine—continued.*

**Espiran.** Fruit deep purplish-black, medium, round; flesh firm, somewhat harsh; bunches small, tapering, well-set. A good, mid-season, open-air Grape.

**Ferdinand de Lesseps.** Fruit clear greenish-yellow, translucent, small, ovate; flesh very tender, melting, juicy, and sweet, with a strong aroma of ripe strawberries; bunches small, tapering. An early Muscat Grape.

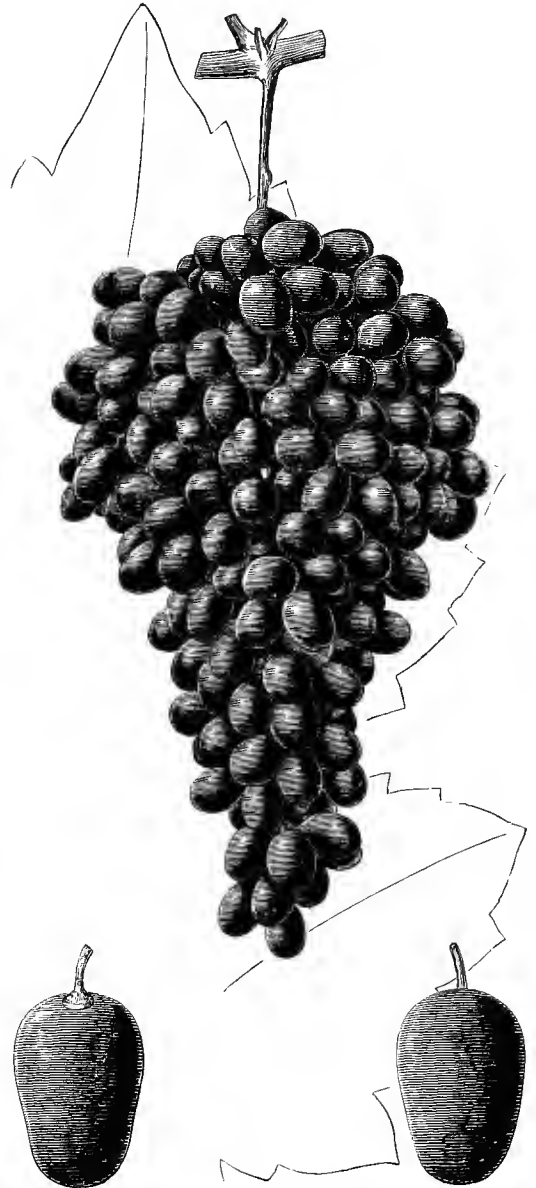


FIG. 189. BLACK MONUKKA GRAPES.

Bunch, one-third natural size; Berries, full size.

**Foster's Seedling.** Fruit clear greenish-yellow, medium, oval, flesh tender and melting, sweet and pleasant; bunches medium, shouldered, well set. An early Sweetwater Grape.

**Frankenthal.** See **Black Hamburgh**.

**Golden Hamburgh.** Fruit greenish-yellow, large, round; flesh soft, melting, watery; bunches medium, broadly shouldered. A mid-season Sweetwater Grape.

**Vine—continued.**

**Golden Queen.** Fruit greenish-yellow, golden when highly ripened, large, long-ovate; flesh soft, squashy, with a faint trace of Muscat; bunches medium, long-tapering, well set. A late Grape.

**Vine—continued.**

**Gros Guillaume.** Fruit deep black, with fine bloom, medium, round; flesh tender, juicy, with little flavour; bunches very large (sometimes exceeding 20lb.), long, regularly tapering, well set. A late, vinous Grape, generally known as BARBAROSSA.

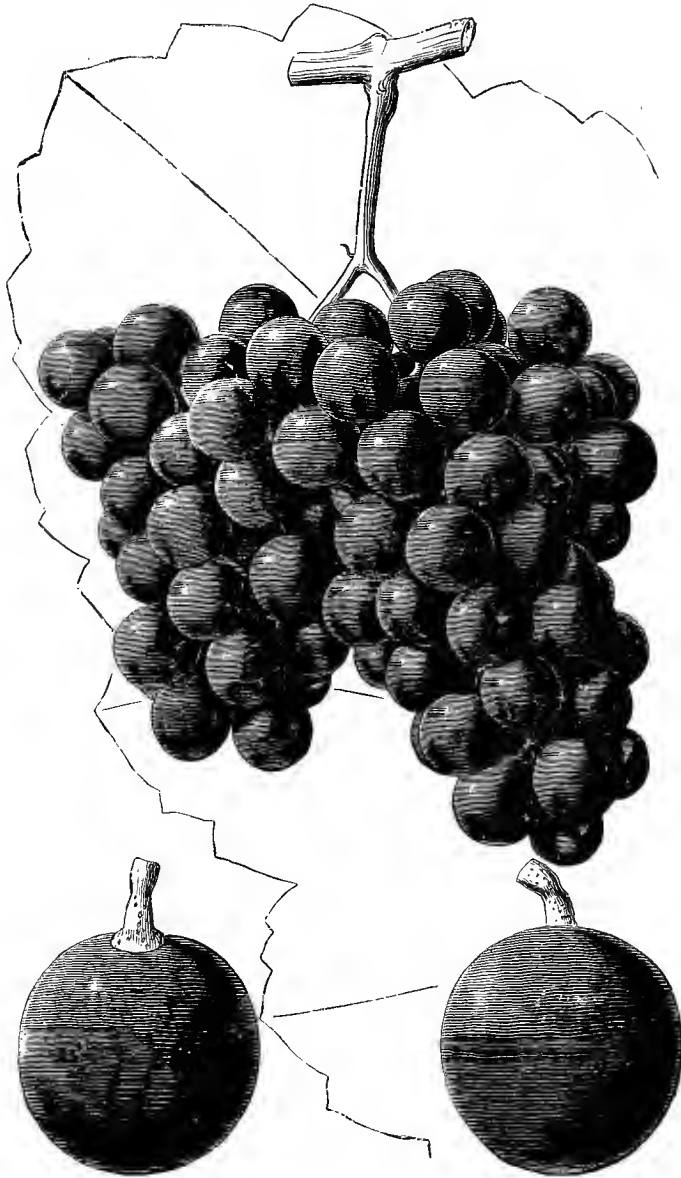


FIG. 190. GROS COLMAN GRAPES.

Bunch, one-third natural size; Berries, full size.

**Grizzly Frontignan.** Fruit of a dull red or grizzly colour, small, round; flesh firm, sweet, and with a rich Muscat flavour; bunches small, cylindrical, close, and compact. A mid-season Muscat Grape.

**Gros Colman.** Fruit black, with a thick bloom, large, round; flesh thick, coarse, with a poor, watery flavour; bunches medium, broadly shouldered, well set. An extremely handsome and excellent keeping, late, vinous Grape. See Fig. 190.

**Gros Maroc.** Fruit nearly jet-black, with a fine bloom, large, truly ovate in shape; flesh firm, juicy, with a brisk, rich flavour; bunches medium, well set. A handsome, late, vinous Grape.

**Grove End Sweetwater.** Fruit greenish-white, small, oval; flesh tender, melting, with a rich, sweet flavour; bunches small, well set. An early Sweetwater Grape.

**Lady Downes' Seedling.** Fruit black, large, round; flesh exceedingly firm, juicy, with a somewhat harsh flavour; bunches

**Vine—continued.**

medium, long-tapering, always well set. A good, late-keeping, vinous Grape.

**Lombardy.** Fruit red or grizzly, medium, round; flesh tender, with a pleasant, sweet flavour; bunches large, broadly shouldered, well set. A mid-season Sweetwater Grape.

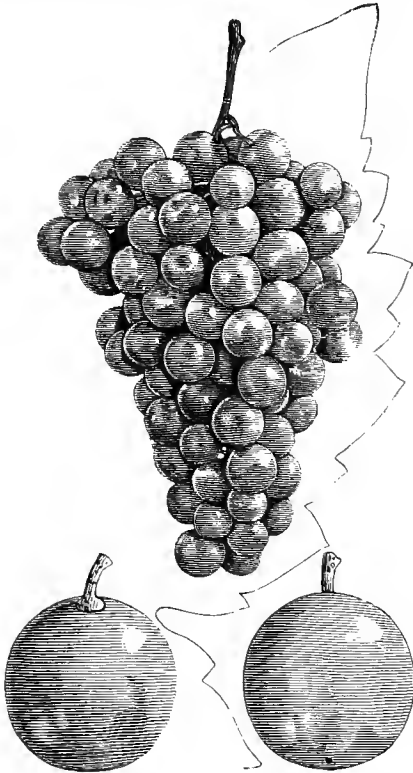


FIG. 191. ROYAL MUSCADINE GRAPES.

Bunch, one-third natural size; Berries, full size.

**Madeleine Royale.** Fruit clear greenish-yellow, medium, oval; flesh tender, juicy, sweet, and pleasant; bunches small, broadly shouldered, well set. An early Sweetwater Grape.

**Madresfield Court.** Fruit purplish-black, with a fine, grey bloom, large, ovate; flesh firm, yet juicy, sweet, and rich, having a strong Muscat flavour; bunches large, long-tapering, well set. A very handsome and excellent, mid-season Grape.

**Miller's Burgundy.** Fruit jet-black with a thick bloom, small; flesh dark, juicy, with a pleasant, sweet, watery flavour; bunches quite small, cylindrical, compact and close. Leaves extremely downy on under surface (hence the name MILLER GRAPE, sometimes used). An early Sweetwater Grape.

**Mill Hill Hamburg.** Fruit reddish-black, very large; flesh melting, juicy, sweet and rich; skin thin; bunches medium, broadly shouldered. An excellent, early Sweetwater Grape.

**Mrs. Pearson.** Fruit greenish-white, medium, round; flesh very firm, yet juicy, sweet, and with a rich Muscat flavour; bunches medium, well set. A mid-season Grape.

**Mrs. Pince.** Fruit purplish-black, coated with bloom, large, ovate; flesh exceedingly firm, very rich and sweet, with a strong Muscat flavour; bunches large, long-tapering, often badly set. A late Grape, which keeps well.

**Muscat Champion.** Fruit red or grizzly, large, round; flesh firm, yet juicy, rich, and with a strong Muscat flavour; bunches short, broadly shouldered. A mid-season Grape.

**Muscat Hamburg.** Fruit purplish-black, large, long-ovate; flesh firm, yet juicy, rich, and with a decided Muscat flavour; bunches medium-sized, loose, broadly shouldered, often badly set. A mid-season Grape.

**Muscat of Alexandria.** Fruit greenish-yellow, golden when highly ripened, large, long-ovate; flesh firm, juicy, sweet, and rich, with a high Muscat flavour; bunches large, long-tapering. A very handsome and excellent, late Grape.

**Vine—continued.**

**Muscat of Hungary.** Fruit greenish-yellow, small, short-ovate; flesh firm, sweet, and having a decided Muscat flavour; bunches small, tapering. An early Grape.

**Ceillade Noire.** Fruit deep black, with a fine bloom, large, long-ovate; flesh very tender and juicy, with a pleasant, rich flavour; bunches long, loose, and straggling. A mid-season Sweetwater Grape.

**Raisin de Calabre.** Fruit white, medium-sized, round; flesh firm, and possessing little flavour; bunches long-tapering. A late, vinous Grape, which keeps well.

**Royal Ascot.** Fruit purplish-black, large, ovate; flesh very firm, with a strong, piquant, plum-like flavour; bunches small, short, compact, well set. A mid-season vinous Grape.

**Royal Muscadine.** Fruit greenish-white, small, round; flesh firm, juicy, sweet, and exceedingly pleasant; bunches small, long-tapering, compact, well set. A good, open-air, early Sweetwater Grape, also known as WHITE CHASSELAS. See Fig. 191.

**Syrian.** Fruit greenish-white, large, ovate; flesh firm, juicy, sweet, and moderately rich. A late, vinous Grape, which keeps well.

**Trebbiano.** Fruit greenish-white, changing to pale amber when fully ripe, large, ovate; flesh firm, sweetly flavoured, but not rich; bunches very large (one example weighing 2½ lb. has been grown), broadly shouldered, well set. A late, vinous Grape.

**Trentham Black.** Fruit jet-black, large, ovate; flesh extremely tender and juicy, with a sweet, rich, and very pleasant flavour; bunches large, loose, and straggling, often badly set. An early Sweetwater Grape.

**Troveren Frontignan.** Fruit, some greenish-yellow, others deep amber tinged with dirty-brown, small, round; flesh firm, crackling, very rich, and highly flavoured; bunches long, tapering, compact, well set. A mid-season Muscat Grape.

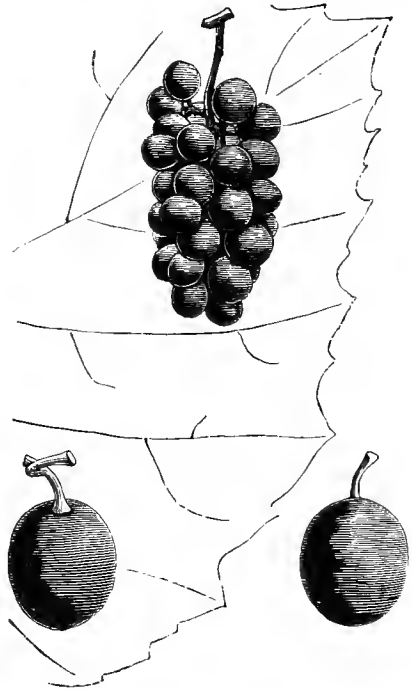


FIG. 192. STRAWBERRY GRAPES.

Bunch, one-third natural size; Berries, full size.

**West's St. Peter's.** Fruit deep purplish-black, medium, round; flesh firm, juicy, sweet, and at all times remarkably fresh; bunches medium-sized, tapering, well set. A late, vinous Grape, which keeps well.

**White Chasselas.** See **Royal Muscadine.**

**White Frontignan.** Fruit greenish-white, small, round; flesh firm, yet juicy, and very richly flavoured; bunches medium, long-cylindrical, well set. A mid-season Muscat Grape.

**Vine—continued.**

**White Nice.** Fruit pale greenish-white, medium-sized, round; flesh moderately firm, juicy, sweet, but not rich; bunches very large, somewhat loose and straggling. A late, vinous Grape.

**White Tokay.** Fruit greenish-white, large, ovate; flesh firm, with a sweet, pleasant flavour when well ripened; bunches large, broadly shouldered, well set. A late, vinous Grape.

**Varieties of American Grapes (*Vitis Labrusca*).**

These form quite a distinct class from the European Grapes. The American Vine is of a remarkably free and vigorous growth. The berries are small; flesh greenish, having a mucilaginous texture, and a strong musky perfume, with a peculiar "foxy," sweetish flavour; bunches small, produced in great abundance. The leaves are large, thick and leathery, very downy or pubescent on the under surface, and but slightly lobed. The varieties existing in America are extremely numerous, and are better adapted to that country than the European Grapes. The Strawberry Grape has been for many years cultivated in this country and in Germany, and by some persons is greatly esteemed. Those here described have been fruited at Chiswick.

**Brighton.** Fruit black, small; flesh tender, of a peculiarly sweet flavour; bunches small.

**Duchess.** Fruit white, medium; flesh brisk, sweet, and pleasant; bunches long, loose.

**Eldorado.** Fruit deep yellow, small, round, having a strong musky flavour; bunches small.

**Golden Pocklington.** Fruit clear yellow, round, small, juicy and sweet; bunches medium-sized, compact.

**Jefferson.** Fruit grizzly-red, large, roundish; flesh melting, of a brisk, sweet, pleasant flavour; bunches small.

**Lady.** Fruit deep yellow, small, round; flesh melting, musky, rich; bunches small, thinly set.

**Moore's Early.** Fruit purplish-black, with a fine bloom, small, round; flesh melting, sweet; bunches small, compact.

**Strawberry.** Fruit purplish-red, small, roundish-ovate; flesh dark, thick or mucilaginous; bunches small, compact, closely set. The ripe fruit emits a strong perfume of ripe strawberries or raspberries. See Fig. 192.

**VINE.** Any trailing or climbing stem.

**VINE, CONDOR.** A name given to *Marsdenia Cundurango* (which see).

**VINE FUNGI.** Many species of Fungi have been recorded as living on Vines in Europe and in North America, and there exists almost a special literature upon these parasites. They vary greatly in their destructive powers; and some species have ravaged the vineyards of both Continents. Inquiry into the best methods of contending with the parasites, and of saving the Vines from complete destruction, has thus been powerfully stimulated. In vinerias in the British Islands, these pests have not caused so great harm as where the Vines are cultivated on a large scale; yet, even in Britain, the harm done is sufficient to render some notice of them desirable in this work. Of the hundred or more species that have been recorded as growing on Vines, only those that give rise to serious disease are mentioned below.

*Vine Mildew* is the name given when the leaves and stems become covered with a whitish or grayish coating, either in patches, or over large portions of the plants. Such an appearance is caused by more than one Fungus. The best-known are *Oidium Tuckeri* (which has long been known in Europe, and which was at one time most injurious in the vineyards of France, and also in those of Madeira), and *Peronospora viticola*, the latter a Fungus brought in recent years from America to France, on imported Vines.

*Oidium Tuckeri* was first described by the well-known botanist, Rev. M. J. Berkeley, from specimens sent to him, in 1847, by Mr. Tucker, a gardener in Ramsgate. It was detected in France in 1848. By 1851 it had spread to all the vineyards in Europe; and in the next year it was observed in Madeira. The Fungus shows itself as a thin, pale layer or coat on the leaves and on the young

**Vine Fungi—continued.**

twigs, and even occurs on the fruits. The diseased parts often become pale, and more or less distorted; the coat becomes thicker; then the spots become brown, and the parts die. An examination with the microscope shows that the surface of the part is covered with the filaments of the Fungus creeping over the epiderm cells of the diseased spots, and that from the side of each filament of the Fungus little suckers are pushed into the epiderm-cells, and absorb food from them for the Fungus. From the other side of the filaments erect branches arise, each formed of a row of cells, of which those at the ends of the branches (conidia) are oval, and break away, to produce the Fungus again when they fall on suitable situations on the Vine leaves or branches. No other mode of reproduction has yet been detected in this Fungus, though it undoubtedly belongs to a more fully-developed form, such as is described under **Mildew and Oidium**. Mr. Berkeley has suggested that it may belong to the very common *Erysiphe communis*. Plants suffering from its attacks have a mouldy, disagreeable smell. Another *Oidium* (*O. Balsamii*), with more slender conidia, sometimes occurs on Vines. The Fungus spreads rapidly in a moist, warm atmosphere, and is greatly checked in dry air, and also by very heavy rain, which washes away the spores.

All dead leaves and stems should be removed and burned, to destroy the conidia. Flowers of sulphur form a complete and thorough cure, as they destroy the parasite without injuring the Vines. The sulphur should be dusted on the Vines in early spring, after the stems have begun to push forth, then again when the blossoms have opened, and lastly, when the grapes are beginning to ripen. To prevent any taste of sulphur being perceptible in the ripe fruits, the third dusting must not be too late. The green organs to which sulphur is to be applied should be moistened, to make the powder adhere.

*Peronospora viticola* had been known, from 1834, as a parasite on almost all the Vines of North America; but it was imported into Europe only in 1878, on plants brought to replace the European Vines destroyed by *Phylloxera*. It has now spread widely through France and Algeria. The diseased leaves, about August, show patches of irregular form, and whitish in colour, which soon become brown and dry. The tissues of the leaf are traversed by mycelium, furnished with small haustoria, or suckers, for taking food from the cells; and the white spots bear myriads of erect, fruiting branches of the Fungus (see **Peronospora**), each repeatedly divided into three, less often into two, branches. The terminal branches are short, and on the tip of each is an egg-shaped spore. In the spore there grow five or six smaller spores (zoospores), which escape by the bursting of the cell-wall of the spore, and can swim about in dew-drops and moisture of any kind; and at last the zoospores settle down on the leaves, push a slender tube through the epiderm, and give rise to a new plant. The diseased plants produce defective crops of fruit. The grapes also may be attacked. The resting, or sexual, spores of the Fungus have been found in *Vitis æstivalis*; they have a thick, smooth, yellow coat.

Vines grow more healthily in well-watered than in dry soil, and are therefore better able to resist the attacks of the parasite; but a close, moist atmosphere is hurtful, as it encourages the growth of Moulds. The fruiting threads may be destroyed by dusting the plants with a mixture of sulphur and quicklime; but the internal mycelium renders a thorough cure very difficult. Probably the best preventive of the disease is burning dead leaves, stems, prunings, &c.

Several other species of Fungi have been recorded as very destructive in the vineyards of France, Germany, and Italy; but they have not been observed to be hurtful

**Vine Fungi**—continued.

in England, and therefore require but brief notice here. The roots have been found destroyed by four different Fungi, viz., the *Rhizomorpha* stage of *Agaricus melleus*

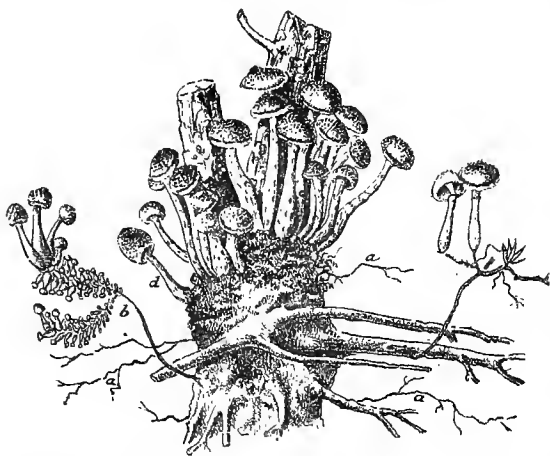


FIG. 193. MASS OF *AGARICUS MELLEUS* ON ROOT OF YOUNG PINE —*a, a, a*, Mycelium in form known as *Rhizomorpha fragilis*; *b*, Very young Spore-bearers produced on *Rhizomorpha fragilis*; *d*, Older Spore-bearers (*Agaricus melleus*) produced by Mycelium of form known as *Rhizomorpha subcorticalis*.

(Figs. 193 and 194) (see **PINUS, FUNGI**), *Dermatophora necatrix*, *Roesleria hypogæa*, and an imperfect mycelium enveloping the lateral roots, and called by Persoon

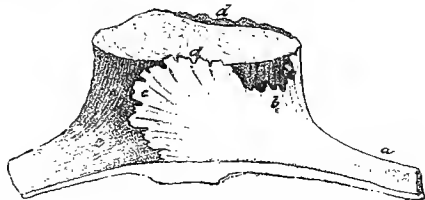


FIG. 194. *RHIZOMORPHA FRAGILIS* var. *SUBCORTICALIS*. Mycelium of *Agaricus melleus*, in the form it assumes when growing between the Bark and the Wood—*a*, Form intermediate between *fragilis* and *subcorticalis* expanding into the latter on the left; *b*, Portion where growth is slower; *c*, Lobed Margin; *d, d*, Margin that has reached cut surface of Stump; *e*, Wood of Stump of Fir-tree.

*Fibrillaria xylotricha*. These Fungi differ in details of their attacks on the Vine roots; but they all kill the roots, usually beginning with the younger ones; the leaves turn yellow and fall off; and the Vines perish, though some continue to exist in a sickly state for one or two years, if left untouched. Against these root-parasites, the only effectual remedy is to remove and burn the diseased plants, taking the utmost care to remove all fragments of wood, &c., from the soil, to prevent the disease from reaching healthy subjects. No cure is known for plants already attacked by any of these Fungi.

Another disease very fatal in European vineyards assumes the form of dark spots on the young shoots and leaves, on the flower-stalks, and on immature fruits. At first the spots are round, brownish pustules; but they soon extend, and often become confluent. The centre becomes ashy-grey or pinkish-grey, owing to the outpouring of minute, oval conidia through the torn epidermis; but the rest of the spot becomes nearly black. It is surrounded by a narrow, brown border. All the surface tissues of the

**Vine Fungi**—continued.

spot are hardened, and are full of the mycelium of the Fungus; and the conidia or spores are produced on the surface of the mycelium, but below the epidermis, through a tear in which they escape when mature. This Fungus is known as *Gloeosporium ampelophagum*. Those parts of the Vines on which it grows are killed or seriously stunted, and even the plants themselves may be killed in bad attacks. When it grows on the flower-stalks, the entire clusters of fruit are destroyed. When it occurs on the grapes, they seldom come to ripeness. The disease has attracted much attention; and it is said that an effectual cure for it has been found in the employment of a solution of sulphate of iron (10 to 15 per cent.) in water, applied in winter, with a pretty large brush, to all parts of the branches. This solution destroys all spores of Fungi, but does not seem to injure the bark of the Vines. As a preventive measure, all prunings and dead leaves should be carefully removed from the surface of the soil, lest they might spread infection among the healthy plants in the following spring.

In Saccardo's great work, the "Sylloge Fungorum," many other Fungi are noted as parasitic on Vines, some of which (*Fusarium Zavianum*, *Pionnotes Biasolettiana*, &c.) are occasionally more or less hurtful. Probably one or other of the remedies indicated above would prove suitable against these parasites, as well as against any others that may in future be met with in vineries in Great Britain.

**VINE GALLS.** Of these, by far the most to be dreaded are the Galls produced on stems and leaves by *Phylloxera vastatrix* (see **GRAPE OR VINE LOUSE**). The only other Galls on Vines in Europe worth mention are pale, hairy growths (*Erineum Vitis*) caused by Mites (*Phytoptus*), in patches on the lower surface of the leaves, and two produced by Gall-midges. Of these, one is a swelling of the twigs, and is the work of an undetermined species of Midge (*Cecidomyia*); it occurs in the South of France, and in the South of Russia. The other produces swellings, not unlike those of *Phylloxera*, on the leaves. They are about  $\frac{1}{10}$  in. in diameter, conical on the upper surface, and more rounded below. Several grow in each leaf. This Gall has been found in Austria.

The North American Vine Galls are far more varied in size and form than the European, and several of them attain considerable size. All that will be referred to here are the work of Gall-midges (*Cecidomyia*). The "Filbert Gall" is developed from a bud, and forms a mass  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in diameter, made up of from ten to forty woolly, greenish, juicy Galls, each tenanted by one orange-yellow larva. The "Tomato Gall" consists of an irregular mass of juicy, yellowish-green or red swellings, each occupied by four or five larval chambers, with one orange-yellow larva of *Lasiptera Vitis* in each. The whole mass may reach from  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. across.

The "Apple Gall" is attached to the stem, and is like a hazel-nut in form. It is nearly  $\frac{1}{2}$  in. in diameter. There are eight or nine furrows down the surface, which correspond to chambers in the interior, in an upper and a lower series. Each is occupied by a bright yellow larva of a *Cecidomyia*. The gall is juicy, and the surface is covered with short, downy hairs. The "Trumpet Gall" rises from the upper (rarely the lower) surface of the leaf. As a rule, many stand on each leaf, two or three often being united at the base. These Galls are about  $\frac{1}{4}$  in. long by  $\frac{1}{10}$  in. broad in the widest part; they taper a little towards the base, and the other end is sharp. Their colour varies from bright red to green.

**Remedy.** None of the above Galls have yet been recorded from England. Should any of them be introduced with European or American Vines, they should be removed from the plants while still young and soft: no further remedy is needed.

**VINEGAR PLANT.** When fluids containing sugar in solution are allowed to stand exposed to the atmosphere, their composition undergoes considerable chemical changes in a short time. The microscopic spores of various kinds of Fungi fall into them, germinate, and feed upon the sugar, which they break up into simpler combinations. Carbonic Acid gas is given off; and a quantity of Alcohol is formed at the expense of the sugar. If the fluid is allowed to stand undisturbed for some time, the Alcohol also is attacked, and is changed, by the addition of Oxygen to it, into Vinegar. These changes are accompanied by the formation, on the surface of the fluid, of a tough, slimy layer, usually covering the whole surface, but not extending to a great depth. On examining a portion of the mass, it will be found to form layer on layer, separable from one another, the lower layers hanging in a flocculent web into the fluid. The microscope shows that the mass is made up chiefly of the translucent filaments of a Fungus, consisting of short, rod-like cells, end to end, imbedded in a gelatinous substance. Some of the cells are swollen at intervals. All are very minute; but they are capable of growing and reproducing themselves, if broken off the filaments. Intermixed with these are various other forms of cells, belonging to other kinds of Fungi that grow in the fluid, since many kinds of spores usually fall into it. In fact, it is impossible to obtain an unmixed culture of such small Fungi, except by the exercise of the utmost care. Trustworthy observations and experiments prove that the production of Vinegar from Alcohol goes on only when this mass of Fungus is present (except when artificially effected by chemical agencies); hence the mass is usually known as the Vinegar Plant. Various species of Fungi have been detected in it; but there is reason to believe that the species which effects the formation of Vinegar is a member of the great group of *Bacteria*. It has received various names; those most commonly used are *Mycoderma Aceti*, Pasteur, and *Bacterium Aceti*, Kuetz. It forms the greater part of the Vinegar Plant, and its cells vary greatly in shape, being globular and very minute (*Micrococcus*), or like short rods (*Bacterium* form), or longer rods (*Bacillus* form), or filaments, as described above (*Leptothrix* form), all united by the gelatinous slime into what is often called a *Zooglea*. Intermixed with the *Mycoderma*, or at times forming separate patches, are the filaments and groups of cells of *Saccharomyces Mycoderma*, a Fungus nearly allied to the Yeast of beer. By some botanists this has been regarded as the active agent in the production of Vinegar. *Mycoderma Aceti* has the power of absorbing Oxygen from the atmosphere, and of effecting its union with the Alcohol to form the Vinegar; and such cells of this Fungus as are in immediate contact with the air can even cause the breaking up of the Vinegar into Carbonic Acid and water, by continuing the process of oxidation. In France, *M. Aceti* is employed in the commercial manufacture of Vinegar. Shavings of wood, covered with the Fungus, are put into solutions containing sugary substances, or Alcohol, such as beer, cider, sap of fruits, wines, brandy, &c. A temperature of from 85deg. to 95deg. Fahr. is found to give the most favourable results, both in rapidity and in amount of production of Vinegar. *Mycoderma Aceti* does not thrive in very acid wines or other solutions, and it generally appears in them only after they have been rendered less acid by the growth in them for some time of *Saccharomyces Mycoderma*. If a Vinegar Plant is allowed to remain on the fluid after it has exhausted the sugars available for its nourishment, the surface becomes covered, after a time, with blue, green, or yellow Moulds (*Penicillium glaucum*, &c.), or other minute Fungi. These were at one time believed to be developed as a further stage of the Vinegar plant itself; but they must be regarded as growing at the expense of the latter, when it is weakened by its food being exhausted.

**VINEGAR-TREE.** A common name for *Rhus glabra* and *R. typhina*.

**VINE, GLORY.** A common name for *Clianthus* (which see).

**VINE, GRANADILLA.** See *Passiflora quadrangularis*.

**VINE, GRAPE-FLOWER.** See *Wistaria*.

**VINE, ICE.** A name applied to *Cissampelos Pareira* (which see).

**VINE, KANGAROO.** See *Vitis antarctica*.

**VINE LOUSE.** See *Grape or Vine Louse*.

**VINE MAPLE.** A name given to *Acer circinatum* (which see).

**VINE, MILK.** A name sometimes used for *Periplota græca* (which see).

**VINE MOTHS.** The larvæ of several species of Moths feed on the leaves, twigs, or young fruit of Vines. Some of them are Hawk Moths (see *Sphingidae*), the Elephant Hawk Moths (*Deilephila Elpenor* and *D. Porcellus*) being the commonest. Others belong to the Night Moths (see *Noctua*). Of the latter may be specially noted the White-line Dart Moth (*Agrotis Tritici*), the Large Yellow Under-wing Moth (*Triphena pronuba*), and the Gothic Moth (*Nonia typica*). All three feed on many plants, the two first-named being almost omnivorous; and all of them destroy the shoots and leaves of Vines, though the larvæ differ a good deal in their habits. Those of *Agrotis Tritici* and of *Triphena pronuba* hide in the soil by day, but at night they gnaw the young shoots near the ground; and it is thus difficult to detect them. The methods recommended against **Surface Caterpillars** may be employed to lessen their numbers. The larvæ of *Nonia typica* feed, in autumn, on the upper surface of the leaves of most kinds of fruit-trees, including Vines. The young larvæ live in companies, packed side by side, almost motionless, but eating away the surface membrane of the leaves steadily forward, and leaving brown, dead patches behind them. When about a fortnight old, they drop to the earth, and thereafter feed on low plants, till the cold weather of winter makes them go under shelter till spring, when they resume their life on the low herbage. They are dull brown, with a darker line down the back and one on each side, and a series of oblique, short, white lines along the lower part of each side. It is easy to remove the companies of larvæ by hand-picking, if they are doing injury to the Vines.

Certain of the smaller Moths belonging to the **Tortricina** (which see) are extremely destructive in the vineyards of France and Germany; but they are seldom the causes of much harm in British vineries, though they occur sparingly in England. *Enectra Pilleriana* (called also *Tortrix Pilleriana*) has been the subject of very exhaustive investigation, by Audouin and other French naturalists, under the name "Pyrale de la Vigne." Its larvæ live in rolled Vine leaves, and are very hurtful on the Continent; but the insect is too rare in England to call for a longer notice here. An allied insect (*Eupacilia ambiguella*) is almost equally hurtful abroad, as the larvæ feed on the flower-buds and on the young grapes, and envelop the clusters in webs, which prevent the growth of the fruit, and promote its early decay. This insect, also, is too rare in England to be dangerous. The fore wings reach a little over  $\frac{1}{2}$  in. in span: they are ochreous, with a greyish streak along the basal half of the front margin, and a broad, slanting, dark grey bar about the middle of the wing; the head and thorax are ochreous. *Lobesia reliquana* (also called *Tortrix vitisana* and *Grapholitha botrana*) has very similar habits to the last-named species, devouring the flower-buds, and spinning the clusters of young fruit up in webs. In bad attacks, as much as



**Vine Moths**—*continued.*

half the crop has been lost in this way. This insect has been extremely troublesome in Austria. It is not rare in the South of England, though it has done little mischief in this country as yet. It is a little less than  $\frac{1}{2}$  in. in span of fore wings, which are chestnut-red, marbled with pale buff, and with two dark brown, white-edged, triangular spots on the hinder margin of each. The change into pupæ occurs in the soil below the Vines. The larvæ may be detected by their webs, and should be removed, either by hand-picking the ravaged clusters, or by shaking or jarring them above a sheet, tarred tray, or any other contrivance for capturing the larvæ shaken off the plants. In the "Gardeners' Chronicle" for Sept. 23, 1883, *Ecnecra Pilleriana* and *Lobesia reliquana* are noticed and figured by Professor Westwood; and, in the same newspaper, a month later, still another insect-foe is added. This is *Ditula angustiorana* (also called *Tortrix angustiorana*). The last-named is nearly related to *Lobesia reliquana*, but is larger. The fore wings measure from  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in span, being ochreous in the males, and reddish-brown in the females; in both sexes, the wings show a darker patch at the base, a chestnut-brown patch slanting from the middle of the wing to the hinder angle, and darker spots irregularly scattered over the outer half of the wing, the most conspicuous of these being a triangular spot on the front border. The larvæ have been found living on most fruit-trees, as well as on Privet, Hawthorn, and other shrubs; and within the past few years they have been discovered in ripened grapes in English vineries. They also feed on the Vine leaves, but not in such numbers as to seriously injure the plants in this way. Though abundant in many parts of England, *Ditula angustiorana* usually feeds on a variety of food-plants in preference to Vines.

Among the *Tineina* (see **Moths**) there are few species that are dangerous to Vines. Of one small Moth (*Antispila Pfeifferella*) the larvæ, which usually feed on the leaves of Dogwood, sometimes mine in the Vine leaves, and, when about to become pupæ, form flat cases composed of two pieces cut out of the leaves, and attach them to the leaves or branches. The pupæ lie protected in the cases till the emergence of the Moths. The fore-wings of the latter reach only about  $\frac{1}{2}$  in. in span; they are brown, with a coppery or golden gloss, and near the middle they are crossed by two narrow, yellow bands, the outer of which is broken in the middle. The injury done to the leaves by this species is seldom noticeable, though the Moth is not rare in England.

**Treatment.** This varies with the habits of the larvæ that are doing the harm. Hand-picking is a sufficient remedy against the larvæ of Hawk Moths, and the groups of larvæ of *Namia typica*. It is the only efficient method against Leaf-miners, such as *Antispila*; and it must also be resorted to against the larvæ of *Tortricina*, which live inside the young or ripe fruits, or in the clusters, inclosed in webs. The larvæ, and the leaves or grapes in which they live, should be destroyed, not merely thrown on the ground. Hand-picking is also of use where the eggs (e.g., of *Ecnecra Pilleriana*) are placed in clusters on the leaves. Those larvæ that conceal themselves in the soil by day, and emerge from their concealment by night to feed on the shoots and leaves, or that gnaw the bark of the stems and roots, should be combated as recommended under **Surface Caterpillars**. Such larvæ as live in rolled leaves may be collected in sheets or trays laid below the branches, which should be shaken or jarred, to cause the larvæ to drop from their concealment. The larvæ of some of the *Tortricina* that injure the Vines and fruits, pass the winter under the loose bark on the stems, and emerge, when the weather becomes milder, to devour the buds, young leaves, and flowers. The pupæ of some are protected during winter in similar retreats. It is, therefore, desirable to remove

**Vine Moths**—*continued.*

all loose bark, and this can be done in winter by means of a brush of stiff fibres, e.g., of piassaba. All dead leaves and rubbish should also be removed from the surface of the soil, and either consigned to the compost-heap or burned. In the continental vineyards, the Moths are trapped by fires, or by shallow dishes of water, into which they fly. A solution of potassic sulphate (1 per cent.), sprayed over the flower-buds about the time the first brood of Moths is on the wing, and over the young fruits when the second brood is ready for egg-laying, has been found to materially lessen the injury to the crop.

**VINE, MOUNTAIN.** See *Viola tricolor lutea*.

**VINE, PEPPER.** A common name for *Ampelopsis bipinnata* (which see).

**VINE, PIPE.** A common name for *Aristolochia Siphon* (which see).

**VINE, POISON.** A name frequently applied to *Rhus Toxicodendron* (which see).

**VINE, POTATO.** A common name for *Ipomœa pandurata* (which see).

**VINERY.** See **Vine**.

**VINE SCALE INSECTS.** Though occurring in France and in Germany, these insects are not native in Britain. The one most frequently found on Vines is *Lecanium Vitis*, also called *Coccus Vitis*. The female is covered with an oval, convex scale, which is a little narrowed in front; the colour is reddish-brown, with black dots; the shield is bordered by the white, cottony secretion in which the red eggs are embedded. The male insects are very small; they are brick-red, with black thorax, brown antennæ, and two transparent wings, each with a thickened and red front border; the body ends in two long bristles. This insect lives on the old stems of Vines, preferring such as are sickly; and it occurs either singly or in groups.

*Mytilaspis Vitis* is another Vine Scale, met with in Germany. It is very like the **Apple Mussel Scale** (which see), and has usually been mistaken for it; but the two species differ in certain minute characteristics. The larvæ live on the young twigs near the buds; and the spots on which they are placed become brown or blackish. The females live on the twigs of the second year's growth.

**Remedies** are detailed under **Scale Insects**. The branches and stems must be well cleansed from the Scales, by means of a stiff brush and strong lye of wood-ashes, or solution of kerosene or carbolic acid. Good manure should afterwards be applied to the roots.

**VINE, SILK.** See *Periploca græca*.

**VINE, SILVER.** A popular name for *Scindapsus argyrea* (which see).

**VINE SLUG.** The name popularly given, in North America, to the larva of the Grape-vine Sawfly (*Selandria Vitis*), which occasionally almost strips the leaves off the Vines in vineyards in the United States. The perfect insect has four wings, which are smoky-brown, but semi-transparent, with brown veins. The thorax is red, the rest of the body black, and the fore legs and lower side of the other legs pale yellow or whitish. The female is  $\frac{1}{2}$  in. long, the male rather shorter. The females lay their eggs in small clusters on the lower surface of the leaves at the tips of the shoots, in the spring and early summer. The larvæ feed side by side, in groups of fifteen to twenty. Beginning at the edge of a leaf, they eat inwards, with great regularity of rank, till they reach the leafstalk; then they eat the next lower leaf, and so on down the shoot. The full-fed larvæ are a little more than  $\frac{1}{2}$  in. long, and are thickest a little behind the head, thence tapering

**Vine Slug**—*continued*.

backwards. They are pale yellow, with darker or greenish backs. Each ring bears two cross rows of minute, black dots. The head and the tip of the last segment are black. At the last moult they become entirely yellow, and, crawling down to the soil, burrow into it, and form small, oval, earthen cocoons. In a fortnight, the autumn brood of Sawflies emerges, and from their eggs a new brood of larvæ is hatched.

**Remedies.** These insects have not been found in Europe, but may be brought from America with Vines. If introduced, the infested Vines should be sprinkled with Hellebore powder ( $\frac{1}{2}$ oz. in 1 gal. of water) or Paris Green (half-a-teaspoonful in 1 gal. of water).

**VINE, WATER.** A common name for **Phytocrene** (which see).

**VINE WEEVILS.** Several species of the great group of Weevils are hurtful to the young twigs and leaves of Vines. They are hence sometimes distinguished as Vine Weevils; but this name is rather misleading, as they are all hurtful also to many other cultivated plants. They belong to the genera *Otiorynchus* and *Rhynchites*. The species of most frequent occurrence on Vines are: *O. Ligustici*, black, with greyish scales; *O. picipes* (Clay-coloured Vine Weevil), of a brown or earthy colour, sometimes approaching clay-yellow; *O. sulcatus*, black or dark brown, with tufts of grey hairs on the wing-cases; and *R. betuleti*, shining blue or green, and hairless. A full account of these insects, and of the appropriate remedies against them, will be found under *Otiorynchus* and *Rhynchites*.

**VINE, WONGA-WONGA.** A common name for *Tecoma australis* (which see).

**VINEYARD CANE.** A common name for *Arundo Donax* (which see).

**VIOLA** (the old Latin name used by Virgil, &c., akin to the Greek *Ion*). Heartsease; Pansy; Violet. Including *Erpetion*. ORD. *Violariæ*. A large genus (about 100 species) of mostly hardy, perennial herbs, rarely suffrutescent; nearly sixty are found in North temperate regions (seven in Britain), about thirty in South America, two in South or East Africa, and eight in Australia or New Zealand. Flowers often cleistogamous (except in the group of which *V. tricolor* may be taken as a representative)—the large-petaled ones appear first, and often yield no seed; the small-petaled, or apetalous ones, appear late, and are prolific—sepals sub-equal, produced at the base; petals spreading, the lower ones often larger, spurred or saccate at base; anthers connate, the connectives of the two lower ones often spurred at the base; peduncles axillary, one or rarely two-flowered. Leaves alternate; stipules persistent, often leaf-like. Of the large number of species introduced, the best-known are here described; they are mostly dwarf plants—seldom exceeding 6in. in height—adapted for planting on rockwork, in flower borders, and, if sufficiently plentiful, in wild gardens, &c. Some of the species are very dwarf and compact in habit: these should, therefore, particularly if scarce, only be planted in select places where they can receive proper attention. The species may generally be propagated by seeds, by runners, or by divisions.

The numerous varieties of bedding Violas and Pansies are popular and well-known plants, valuable for spring and summer bedding, for mixed borders, and for many other situations; they flower in the greatest profusion, and over a lengthened period, if the weather is not too hot and dry for their well-being. Seedlings may easily be raised, but varieties must be perpetuated by cuttings or by divisions. The treatment recommended under **Pansy** is also applicable to the bedding Violas.

**Viola**—*continued*.

**Varieties.** The following is a selection of floriferous varieties. Perhaps many others are equally as good as those here named.

ALPHA, bluish-purple. BLUE BELL, violet, shaded blue; very floriferous. CANARY, yellow; fine. CRITERION, violet; free. DICKSON'S GOLDEN GEM, golden-yellow; very free. GRIEVER, yellow. HOLYROOD, indigo-blue; fine. LILACINA, rich lilac. PILGRIM PARK, pure white; large and good. ROYAL VISIT, violet self. SNOWDROP, waxy-white. THE TORY, plum-colour; one of the best.

SWEET VIOLETS (*Viola odorata*). Of these there are several varieties cultivated in gardens, and few flowers are more generally liked, particularly through the winter and spring months. To insure a supply at these periods, a special system of culture must be practised, and frames must be available. Stock plants may be divided—those similarly treated the previous year are preferable—into as many young single crowns as they admit, in April or May, and all the old crowns should be thrown away, unless required for propagating only. The selected crowns should be planted in good ground, and in an open situation, about 9in. apart, allowing 12in. between the rows. A position where Violets generally succeed in summer is a north or north-west border, but much depends on local circumstances and the nature of the soil, whether light or heavy; if light, the north border should be selected, as it would be cooler than elsewhere, and the plants would be less liable to the attacks of Red Spider, which is their greatest enemy. Attention to cleaning, lightly hoeing the surface soil, and watering, if necessary, are important details of summer management. Mulching with spent mushroom beds, or other short manure, is of great advantage if the summer be hot; it keeps the soil cool, and tends to prevent undue evaporation. Syringing, or sprinkling with water from a can, in the evenings, after dry days, is recommended, and most of the young runners which will appear should be cut away when small. Some cultivators save about three runners on each plant, and peg them down; these root and flower well during winter with the parent, and make excellent stock plants for the next year. Towards the middle or end of September, the frames, or pits, should be prepared, and the best specimens lifted and planted in them just close enough to occupy all the space without overcrowding. The frames should have a south aspect, and should be partially filled with well-prepared stable litter and leaves. About 6in. of soil is necessary for planting in, and this should be brought up as near the glass as the foliage will allow, so that full exposure to light and sunshine in winter will be assured. Give a thorough watering, and keep the frames rather close for about a week after planting; plenty of air may then be admitted, on all favourable opportunities, all through the winter, the sashes being entirely removed during sunshine and when there is no frost, and also in very mild weather. Foggy weather is injurious to Violets in frames: it causes damping amongst the leaves, and prevents proper development of the flowers. Marie Louise is one of the best of all Violets for frame culture when treated as described; Comte Brazza and the old Neapolitan are also excellent. The Neapolitan does not generally grow so freely as Marie Louise, and is later in flowering. These three double-flowered varieties are general favourites for frames.

**Varieties.** There are several varieties, both double and single-flowered; the following selection comprises most of the best:

ARGENTIFLORA, purplish-white, very fragrant. COMTE BRAZZA, white, double, sweet-scented; extra good. CZAR, blue, single, large, and produced in great profusion. MARIE LOUISE, lavender-blue and white, very large flowers, sweet-scented; very floriferous, extra fine. NEAPOLITAN, pale lavender; an old and well-known double variety, very sweet-scented. ODORATA ALBA, white, single; dwarf and distinct. QUEEN OF VIOLETS, white, flushed with pink, double. RUSSIAN, blue, single, large, very free; an old variety. VICTORIA REGINA, blue, double, large, fragrant. WHITE CZAR, a white form of Czar.

*Viola*—continued.

- V. altaica** (Altaiian). *fl.* yellow, large; sepals acute, denticulate; spur scarcely as long as the appendages of the sepals; stigma urceolate. March to June. *l.* oval; stipules cuneate, with acute teeth. Stem short. Root creeping, slender, hard. Altaiian Mountains, 1805. (B. M. 1776; B. R. 54; R. G. 1071.)
- V. arenaria** (sand-loving). *fl.* pale blue, on short, axillary branches from a compact rosette; sepals acute; petals broad; spur short. May and June. *l.* orbicular-ovate, obtuse. Europe (Britain), &c. Plant small, tufted, pubescent, 2in. to 6in. in diameter. (Sy. En. B. 174 bis.)
- V. biflora** (two-flowered). *fl.* yellow, the lip streaked with black, small; sepals linear; petals smooth; spur very short; stigma bifid. April and May. *l.* reniform, serrated, smooth; stipules ovate. Stem erect, about two-flowered. Roots creeping. Europe, Siberia, &c., 1752. (B. M. 2089; F. D. 46.)
- V. blanda** (charming). *fl.* white, small, faintly sweet-scented; petals mostly beardless, the lateral ones veined with lilac; spur short. Early spring. *l.* round-cordate or reniform, minutely pubescent. Rootstock creeping. North America, 1802.
- V. calcarata** (spurred). *fl.* blue or white; sepals oblong, glandularly denticulate; spur awl-shaped, longer than the calyx. March to July. *l.* spatulate-roundish or elongated, crenate; stipules palmatifid or trifid. Stems short, simple, tufted. Root fibrous, diffuse. Austria, 1752. A very variable species.
- V. c. albiflora** (white-flowered). *fl.* white, large. *l.*, stipules cut, scarcely ciliated. Stem short. (R. G. 1028.)
- V. c. Halleri** (Haller's). *fl.* blue, large. Otherwise like *V. c. albiflora*. (R. G. 1028.)
- V. canadensis** (Canadian). *fl.*, petals white or whitish inside, the upper ones mostly tinged with violet beneath, the lateral ones bearded; spur very short; stigma beakless. May to August. *l.* cordate, pointed, serrated; stipules ovate-lanceolate, entire. *h.* 1ft. to 2ft. North America, 1783. (S. B. F. G. ser. ii. 62.)
- V. canina** (canine). Dog Violet. *fl.* blue, lilac, grey, or white,  $\frac{1}{2}$ in. to  $1\frac{1}{2}$ in. in diameter; sepals narrow, acuminate; spur obtuse; style clavate, hooked. April to August. *l.* long-petiolate, crenate-serrate, narrow ovate-cordate. Europe (Britain), &c. Very variable in size, habit, and colour of flower. (F. D. 2646.)
- V. c. lactea** (milky). *fl.* grey; petals narrow, the spur very short. *l.* ovate-lanceolate, rounded or cuneate at base. Rootstock short, without runners. Plant very slender. (Sy. En. B. 176, under name of *V. lactea*.)
- V. c. persicæfolia** (Peach-leaved). *fl.* pale lilac or white; spur very short. *l.* oblong-lanceolate, truncate at base; upper ones narrower. Rootstock long, with runners.
- V. capillaris** (capillary). *fl.* pale blue; lateral petals densely bearded; spur short, obtuse, greenish; pedicels axillary, solitary, slender, four to six times as long as the leaves. May to August. *l.* petiolate, ovate or ovate-oblong,  $\frac{1}{2}$ in. to  $\frac{3}{4}$ in. long, obtuse at base, cuneate-decurrent, slightly acute at apex, the margins remotely glandular-serrate. Stems many, tufted, decumbent, leafy. Chili. (F. d. S. 983.)

FIG. 195. *VIOLA CORNUTA*.

**V. cornuta** (horned).\* *fl.* pale blue; sepals awl-shaped; spur awl-shaped, elongated and abrupt at the base. May to July. *l.* cordate-ovate, crenate, ciliated; stipules obliquely cordate, toothed, ciliated. Stems ascending, diffuse. Root fibrous. Switzerland and Pyrenees, 1776. Plant tufted. See Figs. 195 and 196. (B. M. 791.) E. H. 1871, 9, represents one of the numerous large-flowered garden forms, called PERFECTION.

**V. cucullata** (hooded).\* *fl.* deep or pale violet-blue or purple, sometimes nearly white or variegated with white; lateral, and often the lower, petals bearded; spur short and thick; stigma slightly beaked or beakless; scapes 3in. to 10in. high. Early spring. *l.* long-petiolate, erect, cordate, with a broad sinus, varying to reniform and dilated-triangular, smooth or more or less pubescent, the sides at the base rolled inwards when young, obtusely serrate. Rootstocks thickly toothed. North America, 1762. A very variable species. See Fig. 197. (B. M. 1795; S. B. F. G. ser. ii. 298.) There is a variegated form in cultivation.

*Viola*—continued.

- V. c. palmata** (palmate-leaved). *l.* variously three to seven-cleft or parted, or the earlier ones entire on the same plant. (B. M. 535, under name of *V. palmata*.)
- V. dentata** (toothed). A synonym of *V. sagittata*.
- V. eriocarpa** (woolly-fruited). A form of *V. pubescens*.
- V. flabellata** (fan-like). A synonym of *V. pedata*.
- V. flabellifolia** (fan-leaved). A synonym of *V. pedata*.

FIG. 196. FLOWERS OF *VIOLA CORNUTA*.

- V. hederacea** (Ivy-like).\* *fl.* blue, rarely white, usually small, but sometimes 2in. broad; petals glabrous, or the lateral ones slightly pubescent inside; spur reduced to a slight concavity. July. *l.* reniform, orbicular, or spatulate, usually less than  $\frac{1}{2}$ in., but in very luxuriant specimens 1in. to  $1\frac{1}{2}$ in., broad, entire or toothed. Australia, 1823. Plant tufted, half-hardy. (H. E. F. iii. 225; L. B. C. 1133.) SYNS. *Erytion hederaceum*, *E. reniforme* (S. B. F. G. 170).
- V. hirta** (hairy). *fl.* inodorous or faintly scented; spur long and hooked; bracts lower on the peduncle; anther spurs lanceolate. April to June. *l.* narrower and more triangular, with deeper crenatures and a shallower sinus; hairs of petiole more spreading. Otherwise like *V. odorata*. Europe (Britain), &c. (Sy. En. B. 172.)
- V. lactea** (milky). A form of *V. canina*.
- V. lanceolata** (lance-leaved). *fl.* white, small; petals beardless, the lower ones veined with lilac. Early spring. *l.* lanceolate, erect, blunt, tapering into a long-margined petiole, almost entire. Rootstock creeping. North America, 1759. (L. B. C. 211; S. B. F. G. 174.)
- V. montana** (mountain-loving). *fl.* white, at length bluish; spur conical, truncate, straight, greenish, shorter than the sepals; stigma papillose, slightly reflexed. May to July. *l.* lower ones cordate, upper ones ovate, acute; petioles margined; stipules oblong, toothed or incised. Stem simple, erect. *h.* 1ft. Europe and Siberia, 1683. (B. M. 1595.)
- V. m. Ruppii** (Ruppin's). *l.* cordate or lanceolate. Stems procumbent. (A. F. P. iii. 26 and L. B. C. 686, under name of *V. Ruppii*.)
- V. Munbyana** (Munby's).\* *fl.* violet or yellow, large, one to three from the lower axils; spur straight, nearly twice exceeding the calyx; peduncle erect, long-exceeding the leaves. Spring. *l.* ovate-cordate, obtuse, obtusely crenate, glabrous, or the margins slightly ciliated. Stems procumbent. Algiers. A pretty species. *lutea* is a yellow-flowered form.
- V. odorata** (odorous).\* Sweet Violet. *fl.* blue, white, or red-purple, fragrant; lateral petals with or without a tuft of hairs; spur nearly straight, short, obtuse; anther spurs linear-oblong; style hooked; stigma oblique; bracts about the middle of the peduncle. March to May. *l.* deeply cordate at base, the sinus closed; stipules glandular; petioles deflexed-hairy. Rootstock short, scarred, with very long runners. Europe (Britain), &c. (B. M. Pl. 25; Sy. En. B. 171.)
- V. o. alba** (white). *fl.* white.
- V. o. pallida-plena** (pale double). Neapolitan Violet. *fl.* pale lavender, double, very sweet-scented.
- V. o. permixta** (confused). *fl.* pale, scentless. Runners not rooting.
- V. o. sepincola** (hedge-loving). *fl.* dark, scentless. Runners rooting. More hairy than the type.

*Viola*—continued.

**V. palmata** (palmate). A variety of *V. cucullata*.

**V. palustris** (marsh-loving). *fl.* white or lilac,  $\frac{1}{2}$  in. in diameter, scentless; sepals obtuse; lateral petals almost glabrous; spur short, obtuse; stigma obliquely truncate. April to July. *l.* cordate-reniform, slightly crenate, enlarging after flowering; stipules glandular. Rootstock white, scaly, subterranean, creeping; runners short, leafless. Europe (Britain), &c. (Sy. En. B. 170.)

**V. pedata** (pedate-leaved).\* *fl.* usually bright blue, sometimes pale or even white, very large; petals all glabrous, the spur very short; stigma large and thick, margined, obliquely truncate. May and June. *l.* pedately about seven-parted, firm; leaflets linear-lanceolate, entire or incisely three-toothed at the summit, some-

*Viola*—continued.

abruptly narrowed at base. California, 1856. Half-hardy. (B. M. 5004; F. d. S. 2426.)

**V. præmorsa** (bitten). *fl.* yellow, rather large; lower petal veined with brown, emarginate; spur very short; peduncles mostly shorter than the leaves. Spring. *l.* ovate-lanceolate, repandly denticulate or nearly entire; stipules entire. Stems erect, short. North America, 1828. Plant usually densely hirsute. (B. R. 1254.)

**V. pubescens** (downy). *fl.* yellow, the lower petals veined with purple; spur extremely short. Spring and early summer. *l.* very broadly cordate, toothed, somewhat pointed; stipules large, ovate or ovate-lanceolate. Stems simple, erect, naked below, two



FIG. 197. LEAVES AND FLOWERS OF *VIOLA CUCULLATA*.

times very narrow and lacinate; stipules ciliated. Rhizome thick. North America, 1759. See Fig. 198. (A. B. R. 153; B. M. 89; F. M. 350; L. B. C. 536; S. B. F. G. 69.) SYNS. *V. flabellifolia* (L. B. C. 777), *V. flabellata* (S. B. F. G. ser. ii. 247).

**V. p. atropurpurea** (dark purple). *fl.* dark purple; pistil pubescent. *l.*, segments cuneate, incised. (F. d. S. 1361; R. G. 1110, f. a.)

**V. p. bicolor** (two-coloured).\* A very handsome variety, with the two upper petals deep violet, and, as it were, velvety, like a Pansy.

**V. pedunculata** (pedunculate).\* *fl.* deep yellow, large; petals broadly obovate, the two upper ones with conspicuous claws, the lateral ones bearded at the base; spur very short; peduncles twice or thrice as long as the leaves. Spring. *l.* rhombic-ovate, scarcely 1 in. long, rather thick, coarsely and obtusely toothed,

to four-leaved above. *h.* 6 in. to 12 in. North America, 1772. Plant softly pubescent. (L. B. C. 1249; S. B. F. G. 223.)

**V. p. eriocarpa** (woolly-fruited). A stout and more pubescent variety, 1 ft. to 2 ft. high, with woolly pods. (B. R. 390; S. B. F. G. 102, under name of *V. eriocarpa*.)

**V. pyrolæfolia** (Pyrola-leaved). *fl.* yellow; sepals acuminate; petals densely bearded within; spur short, obtuse; stamens emarginate at apex. January. *l.* ovate, sometimes loosely cordate; stipules fringed at apex. Patagonia, 1851. (F. d. S. 665.)

**V. Riviniana** (Rivinus').\* A form of *V. sylvatica*.

**V. rothomagensis** (Rouen).\* *fl.* bright blue, the side petals and lip striped with black; spur tubular, obtuse, shorter than the sepals; bracts near the flower, lanceolate, with a tooth on each

**Viola**—continued.

side. April to August. *l.* ovate, the lower ones somewhat cordate, crenate, fringed; stipules pinnatifid, rather lyrate. Stems zigzag, branched, diffuse. Root rather fusiform. France and Belgium, 1781. Plant hispid or pilose. (B. M. 1498.)

**V. rotundifolia** (round-leaved). *fl.* yellow; lateral petals bearded and marked with brown lines; spur very short. Early spring. *l.* round-ovate, cordate, slightly crenate, lin. broad at flowering time, increasing in the summer to 3in. or 4in., then lying flat on the ground, shining above. Rootstock creeping. North America, 1800.

**V. Ruppii** (Ruppius'). A variety of *V. montana*.

**V. sagittata** (arrow-leaved). *fl.* purple-blue, rather large; lateral, or occasionally all, petals bearded; spur short and thick; stigma beaked. Spring and early summer. *l.* on small and margined, or the later ones on naked, petioles, varying from oblong-cordate to hastate, sagittate, oblong-lanceolate, or ovate, denticulate, sometimes cut-toothed near the base. North America, 1775. Plant smoothish or hairy. (L. B. C. 1471.) SYN. *V. dentata* (L. B. C. 1485).

**V. s. emarginata** (emarginate). *fl.*, petals emarginate or bidentate. *l.* almost triangular, lacerate-toothed near the base.

**V. Selkirkii** (Selkirk's). *fl.* pale violet; spur very large, almost as long as the petals, thickened at the end. Spring and early summer. *l.* round-cordate, crenate, 3in. to 1½in. long, minutely hairy above, and having a deep, narrow sinus; petioles (and scapes) lin. to 2in. long. Rootstock filiform, fibrous-rooted. North America, 1873. A small and delicate plant. (R. G. 752.) SYN. *V. umbrosa*.

**V. striata** (striated). *fl.* cream-coloured or white; lateral petals bearded, the lower ones striped with purplish lines; spur rather thick, much shorter than the petals; stigma beaked. April to October. *l.* cordate, finely serrated, often acute; stipules large, oblong-lanceolate, strongly fringed-toothed. Stems angular, ascending, 6in. to 10in. high. North America, 1772.

**V. suavis** (sweet). Russian Violet. *fl.* pale blue, white at the base, sweet-scented; sepals obtuse; four upper petals narrowest, the lower one emarginate, the two lateral ones with a hairy line; stigma hooked, naked. March to May. *l.* reniform-cordate, crenate, pubescent. Stolons long, creeping and rooting. Tauria, 1820. (S. B. F. G. ser. ii. 126.)



FIG. 198. VIOLA PEDATA.

**V. sylvatica** (sylvan). Wood Violet. *fl.* bluish-purple or lilac, on axillary branches from a radical rosette; base of sepals much produced in fruit; spur short, broad, compressed, furrowed, usually pale. March to July. *l.* broadly ovate-cordate; stipules lanceolate, acute, fimbriated or toothed. Rootstock short. Europe (Britain). Plant glabrous.

**V. s. Reichenbachiana** (Reichenbach's). *fl.* paler, smaller, and earlier than in the species; spur longer; sepals scarcely produced in fruit. (Sy. En. B. 174.)

**V. s. Riviniana** (Rivinus). *fl.* bluish-purple or lilac, scentless, 3in. to lin. across; petals obovate-oblong, the lowest much broader than the others; peduncles long, with two small bracts. Late summer. *l.*, lower ones as broad as (or broader than) long; upper ones a little narrower than long. (Sy. En. B. 173, under name of *V. Riviniana*.)

**V. tricolor** (three-coloured).\* Heartease; Pansy. *fl.* ½in. to 1½in. in diameter; sepals with large auricles; petals purple,

**Viola**—continued.

whitish, or golden-yellow, sometimes particoloured; stigma capitate, excavated. May to September. *l.* long-petiolate, ovate-oblong or lanceolate, lin. to 1½in. long, lyrate, coarsely and remotely crenate-serrate; stipules ½in. to ¾in. broad. Stem 4in. to 18in. long, branched, erect or ascending, angular, flexuous.



FIG. 199. VIOLA TRICOLOR.

Rootstock none. Europe (Britain), &c. See Fig. 199. (Sy. En. B. 173.) In addition to the two most popular names above mentioned, the following are applied to this species: Call-me-to-you, Fancy, Flamy, Garden Gate, Herb Trinity, Jump-up-and-kiss-me, Kiss-me, Kiss-me-at-the-garden-gate, Live-in-idleness, Love-in-idleness, Pink-of-my-John, Three-faces-under-a-hood, Tickle-my-fancy.

**V. t. arvensis** (field-loving). *fl.* white or yellowish; petals usually shorter than the sepals, or wanting. Stem elongated, branched. (Sy. En. B. 179.)

**V. t. Curtisii** (Curtis'). *fl.* blue, purple, or yellow; petals spreading, rather longer than the sepals. Rootstock branched, stoloniferous, tufted. (Sy. En. B. 180.)

**V. t. lutea** (yellow). Mountain Vine. *fl.* blue, purple, or yellow; petals spreading, much longer than the sepals. Rootstock branched. Branches slender, with short stems and underground runners. (Sy. En. B. 181.)

**V. umbrosa** (shade-loving). A synonym of *V. Selkirkii*.

**V. variegata** (variegated-leaved). *fl.* pale violet; spur cylindrical, straight, as long as the sepals. May and June. *l.* cordate-ovate or roundish, violaceous below, obscurely green above, white at the veins, and rather hispid (in fruit-bearing plants large and almost glabrous); stipules lanceolate, denticulated. Root rather hard, sub-divided. Dahuria, 1817. (R. G. 1852, 20.)

**VIOLACEOUS.** Violet-coloured.

**VIOLARIEÆ.** A natural order of broadly-dispersed herbs or shrubs, the former plentiful in temperate regions, the latter more numerous in the tropics. Flowers hermaphrodite, rarely polygamous, axillary, solitary or in cymes, racemes, or panicles; sepals five, imbricated, rarely persistent; petals five, hypogynous or slightly perigynous, unequal or sub-equal, imbricated, often twisted; perfect stamens five; anthers erect; pedicels usually hibracteolate. Fruit a capsule, often opening elastically by as many seed-bearing valves as there are placentas; or an indehiscent berry. Leaves alternate or rarely opposite, simple, entire or rarely lacinate; stipules leafy or small, in the shrubby species generally deciduous. The order embraces twenty-one genera, and about 240 species, many of which are well known in gardens. Examples: *Hymenanthera*, *Sauvagesia*, *Viola*.

**VIOLET.** See **Viola**.

**VIOLET, ADDER'S.** A name applied to *Goodyera pubescens* (which see).

**VIOLET, BOG.** A name given to the species of *Pinguicula*.

**VIOLET, CANATHIAN.** A common name for *Gentiana Pneumonanthe* (which see).

**VIOLET, CAPE.** A name frequently applied to *Ionidium capense* (which see).

**VIOLET, CORN.** See *Specularia hybrida*.

**VIOLET, DAME'S.** See *Hesperis matronalis*.

**VIOLET, DOG.** See *Viola canina*.

**VIOLET, DOG'S-TOOTH.** See *Erythronium dens-canis*.

**VIOLET, FALSE.** A common name for *Dalibarda repens* (now included under *Rubus* as *R. Dalibarda*).

**VIOLET, FOREIGN.** See *Schweiggera*.

**VIOLET, FRINGED.** See *Thysanotus*.

**VIOLET FUNGI.** Violets are liable to the attacks of several species of Fungi, which grow on the stems and leaves, and on the sepals and petals of the flowers. *Urocystis Viola* causes the stems and leaves of *Viola odorata*, and of other Violets, to become greatly thickened and distorted. After a time, the epiderm on the swellings is torn here and there, and displays the dark masses of spores. Each spore consists of a large central cell (which, on germinating, forms a slender mycelium tube), and an outer layer or coat of smaller cells.

*Puccinia Viola* is of very frequent occurrence on the leaves and petioles of many Violets, including the common wild species and most of the cultivated ones. It appears, in early summer, in the form of Cluster Cups (*Æcidium Viola*), and is then easily recognisable by the small, yellow cups thickly dotted over reddish-orange, swollen patches. Each cup has a nearly white margin of little teeth, formed by the torn edges of the burst outer coat (peridium), which incloses a multitude of minute, orange-yellow spores. Afterwards, the cups are replaced by small, brown, powdery masses, irregularly scattered, or in circles, composed of rounded or oval, prickly, brown, one-celled, stalked spores, and of the true *Puccinia* spores, each on a rather long stalk, brown, and made up of two cells end to end.

Another *Puccinia* that grows on Violets is *P. ægra*. This species greatly weakens or kills *V. cornuta*, and has also been found on *V. lutea*. Its *Æcidium* has been named *Æ. depauperans*, from its weakening (or depauperating) effect on the host-plants. It may be distinguished from *Æ. Viola* by the cups being scattered, and not grouped on thickened spots. The two also differ in microscopic peculiarities of their spores.

*Puccinia Fergussoni* grows on the leaf-stalks and leaves of *V. palustris*, producing thickenings of the tissues, overgrown by the brown, two-celled spores. This Fungus is not known to have more than this single form of spore.

Not unfrequently, the leaves of Violets show discoloured spots, which, on examination with the microscope, are found to be due to the presence of species of *Ramularia* (*R. agrestis* and *R. lactea*), or of *Cercospora* (*C. Viola*), &c. These are minute Moulds, and bear elongated, multicellular, transparent or brown spores, on the tips of slender stalks. Or such spots may be dotted over with the small, dark perithecia of *Leptostadia Viola*, one of the *Sphaeriaceæ*, which has eight oval, unicellular spores in each ascus.

Of all the Fungi that occur on Violets, the most destructive are *Puccinia ægra*, *P. Viola*, and *Urocystis Viola*; though the others also may cause considerable disfigurement. These all grow within the tissues of the plants, the only parts pushed to the surface being the organs of reproduction. It is therefore of little use to attempt to cure diseased plants, the interior of which must be full of the Fungi; and it is advisable to remove and burn the plants, to prevent the spread of disease to previously healthy specimens.

**VIOLET, MERCURY'S.** An old name for *Cumpanula Medium*.

**VIOLET, SPURLESS.** See *Erpetion hederacea*.

**VIOLET, TONGUE.** A common name for *Schweiggeria* (which see).

**VIOLET, WATER.** See *Hottonia palustris*.

**VIORNA.** See *Clematis Viorna*.

**VIPER GOURD.** See *Trichosanthes anguina*.

**VIPER'S BUGLOSS.** See *Echium*.

**VIPER'S GRASS.** See *Scorzonera hispanica*.

**VIRAYA.** A synonym of *Waitzia* (which see).

**VIREYA.** Included under *Rhododendron*.

**VIRGATE.** Twiggy; producing many weak branches; wand-shaped; slender, straight, and erect.

**VIRGILIA** (named in honour of the poet Virgil). ORD. *Leguminosæ*. A monotypic genus. The species is a greenhouse tree, requiring culture similar to that recommended for *Viminaria*.

**V. capensis** (Cape). *fl.* rosy-purple,  $\frac{1}{2}$  in. long; calyx silky, widely campanulate, shortly two-lipped; standard orbicular, strongly reflexed; racemes lateral, longer than the leaves, many-flowered. July. *l.* six to ten-jugate, exstipulate; leaflets linear-oblong, mucronate, nearly 1 in. long, with slightly revolute margins, the young ones silky on both sides, the old ones glabrous and glossy above. South Africa, 1767. (B. M. 1590.) SYN. *Podalyria capensis* (A. B. R. 347).

**V. lutea** (yellow). A synonym of *Cladrastis tinctoria*.

**VIRGINIAN COWSLIP.** See *Mertensia virginica*.

**VIRGINIAN CREEPER.** See *Ampelopsis quinquefolia*.

**VIRGINIAN DATE PALM.** See *Diospyros virginiana*.

**VIRGINIAN SILK.** A common name for *Periploca græca* (which see).

**VIRGINIAN STOCK.** See *Malcolmia maritima*.

**VIRGIN'S BOWER.** See *Clematis*.

**VIRGULARIA.** A synonym of *Gerardia* (which see).

**VIRIDESCENT.** Greenish; turning green.

**VIOLA.** Included under *Myristica*.

**VISCARIA.** Included under *Lychnis* (which see).

**VISCID, VISCOUS.** Clammy; sticky from a tenacious coating or secretion.

**VISCUM** (the old Latin name used by Virgil and Pliny, akin to the Greek *Imos*). Mistletoe. ORD. *Loranthaceæ*. A genus comprising nearly thirty species of stove, greenhouse, or hardy shrubs, parasitic on trees, inhabiting the temperate and warmer regions of the globe. Flowers dioecious or monoecious, at the axils or nodes, or at the tips of the branches, three to five in a fascicle or rarely solitary, the fascicles sessile or rarely on short peduncles; perianth tube in the male flowers very short and solid, in the females adnate with the ovary, the limb three or four-parted; bracts often small. Berry one-seeded, naked or crowned with the perianth. Leaves sometimes flat and rather thick, sometimes reduced to minute teeth or scales. *V. album*, the common Mistletoe, has been associated with many superstitions from the most ancient times, and has been highly extolled for its medicinal virtues. It is, however, now excluded from the Pharmacopœias. "The origin of the modern custom connected with Mistletoe is not very clear. Like many other customs, its original significance is only guessed at. If known, perhaps the innocent merriment now associated



**Viscum**—*continued*.

with the plant would be exchanged for a feeling of stern disapproval, and the Mistletoe would be banished from our homes. . . . Mistletoe may be made to grow on the Apple and other trees, by cutting a notch in the bark on the under-surface of a branch, and carefully inserting the seed therein. Two precautions are especially needed—one is to place the seed in such a position that the embryo shall be directed towards the trunk of the tree, and the other is to avoid crushing the seed. The Apple is the tree on which the Mistletoe grows most abundantly. The orchards in Herefordshire are greatly infested with this parasite, which, however, has a value of its own, for it appears that upwards of one hundred tons of Mistletoe are annually forwarded to London and other large towns from that county alone, for Christmas decorations. Some sorts of Apples are preferred to others for its growth, and, singularly enough, it is rarely, if ever, found on the Pear-tree. Next in frequency to the Apple, the Mistletoe prefers the Poplars, though it is not found on the Lombardy Poplar. Hawthorns, Limes, Maples, and the Mountain Ash, are all favourite habitats for the plant. It has been found on the Cedar of Lebanon and on the Larch, but rarely upon the Oak. Dr. Bull, in a paper in the 'Journal of Botany' (ii. 73), only mentions seven authentic instances of the growth of Mistletoe on the Oak in this country" (Dr. Masters). The ripe fruits may be crushed on young branches of Apple or Thorn trees, and the viscid pulp soon hardens and affords protection to the seed, as well as sufficient resistance to allow it, when germinating, to pierce the bark. To prevent birds from disturbing the seeds after being placed in position, it is necessary to cover with thin canvas, or some such material.

**V. album** (white). Common Mistletoe. *fl.* green, ternate, inconspicuous. March to May. *fr.* white, nearly  $\frac{1}{2}$  in. in diameter, ovoid or globose, viscid. *l.* opposite or in whorls of three,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, obovate-lanceolate, obtuse, five to seven-nerved. Branches terete, dichotomous, knotted. *h.* 1 ft. to 4 ft. Europe (Britain), &c. Shrub yellowish-green, glabrous. (F. D. x. 1657; Sy. En. B. 635.)

**VISIANIA.** A synonym of **Ligustrum** (which see).

**VISMIA** (named in honour of M. de Visme, a merchant of Lisbon). **SYN.** *Acrossanthes*. **ORD.** *Hypericineæ*. A genus embracing upwards of twenty species of stove trees or shrubs, mostly tropical American, four being found in Western tropical Africa. Flowers yellow or whitish; sepals five; petals five, often villous above; stamens in five groups; cymes terminal, sometimes few-flowered, sometimes paniculately many-flowered. Berry indehiscent. Leaves entire, often ample and tomentose or canescent beneath, gland-dotted, rarely highly glabrous. The under-mentioned species, which are all that call for mention in this work, thrive in a compost of loam and peat, and may be increased by cuttings, inserted in sand, under a bell glass, in heat. All are shrubs.

**V. glabra** (smooth). *fl.*, calyx ovate-oblong, obtuse, glabrous; panicle loose. July. *l.* elliptic-lanceolate, glabrous, on short, compressed petioles. Branchlets compressed. *h.* 6 ft. Peru, 1824.

**Vismia**—*continued*.

**V. guianensis** (Guiana). American Gamboge or Gutta-Gum Tree. *fl.* corymbose; calyx villous. August. *l.* ovate-lanceolate, acuminate, dilated at base, glabrous above, rufescent beneath; petioles short. Stems quadrangular. *h.* 8 ft. Guiana, 1824.

**V. guineensis** (Guinea). *fl.*, calyx ovate-lanceolate; corolla glabrous; panicle spreading. May. *l.* ovate-lanceolate, acute, softly dotted beneath; petioles slender. Stems terete; branches divaricate. *h.* 6 ft. Guinea, 1823.

**VISNEA** (called after a Lishon merchant named Visne, who was interested in botany). **ORD.** *Ternströmiaceæ*. A monotypic genus. The species is a greenhouse, ever-green tree, with the habit and inflorescence of **Eurya** (which see for culture).



FIG. 200. FLOWERING BRANCHLET OF *VISNEA MOCANERA*.

**V. Mocanera** (so named by Linnæus on account of the fruit being supposed by some authors to have been the Mocan, which was made into a kind of syrup, and largely employed by the aboriginal inhabitants of the Canary Islands). *fl.* rather small, sub-sessile; sepals much imbricated; petals connate at base; stamens numerous. March. *fr.* baccate, indehiscent. *l.* smooth, alternate, elliptic or lanceolate. Canary Islands and Madeira, 1815. See Fig. 200. (R. H. 1882, p. 212.)

**VITELLARIA.** A synonym of **Lucuma** (which see).

**VITEX** (the old Latin name used by Pliny for this or some similar shrub). *SYNS.* *Limia*, *Nephandra*, *Psilogyne*, *Wallrothia* (of Roth). *ORD.* *Verbenaceæ*. A genus comprising about sixty species of stove, greenhouse, or hardy trees or shrubs, broadly dispersed over the warmer regions of the globe, a few extending to temperate Asia and South Europe. Flowers white, blue, violet, or yellowish, in variously-disposed cymes; calyx five-toothed or cleft, or rarely three-cleft; corolla tube straight or slightly incurved, usually short, the limb oblique, spreading, sub-bilabiate, five-cleft, the lower lobe largest; stamens four, didynamous; bracts small or rarely longer than the calyx. Leaves opposite, often digitately compound, rarely one-foliolate or simple; leaflets three to seven, petiolulate, entire or toothed. A selection of the best-known species is given below. *V. Agnus-castus* succeeds in any common, tolerably dry soil, and may be increased by cuttings, inserted in similar soil, under a glass, in autumn. A compost of loam and peat is most suitable for the stove and greenhouse species, which may be multiplied by cuttings, inserted in sand, under a glass, those of the stove kinds in heat.



FIG. 201. FLOWER OF VITEX AGNUS-CASTUS.

**V. Agnus-castus** (classical name).\* Chaste-tree; Hemp-tree; Monk's Pepper-tree; Tree of Chastity. *fl.* pale lilac; cymes sub-sessile, in glomerate whorls; panicles terminal or axillary. August. *l.* long-petiolate, mostly five-foliolate; leaflets lanceolate, acuminate, attenuated at base, entire or sometimes cut-serrate, whitish beneath. *h.* 6ft. South Europe, 1670. Shrub, hardy in the South of England. See Fig. 201. (*S. F. G.* 609.)

**V. bicolor** (two-coloured). A synonym of *V. Negundo*.

**V. bignonioides** (Bignonia-like). *fl.* blue; cymes somewhat head-like, on peduncles 2in. to 3in. long. June. *l.* petiolate, five-foliolate; leaflets oblong, acuminate-cuspidate, narrowed at base, entire, 2in. or more long, glabrous, sub-equal; common petiole 1½in. or more long. *h.* 8ft. Venezuela, 1826. Stove tree.

**V. Doniana** (Don's). Black Plum. *fl.* disposed in a moderate-sized panicle. *l.* five-foliolate, obovate. Sierra Leone. A large, stove tree.

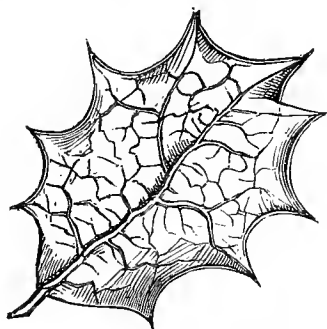


FIG. 202. LEAF OF VITEX ILCIFOLIA.

**V. ilicifolia** (Holly-leaved). *fl.* in axillary cymes, longer than the leaves, on long peduncles, trichotomously branched, rusty-pubescent. Summer. *l.* simple, very shortly petiolate, broadly oval, sub-acute at apex, acute or cordate-emarginate at base, very slenderly reticulate-veined; margins sinuate-toothed, the teeth spiny. West Indies. Stove shrub. See Fig. 202.

**Vitex**—continued.

**V. Lindeni** (Linden's).\* *fl.* pale lilac, streaked with red inside the tube, shortly pedicellate or sessile, in three to six-flowered, pedunculate, axillary cymes; corolla tube thrice exceeding the calyx, the limb flat, two-lipped, the upper lip of two smaller, the lower of three larger, rounded lobes. May. *l.* digitately three to five-foliolate, on slender petioles; leaflets sessile, elliptic or elliptic-obovate, abruptly acuminate, pale green, glabrous. Branches spreading; branchlets and inflorescence hoary-pubescent. Columbia, 1876. Stove shrub or small tree. (*B. M.* 6230.)

**V. Negundo** (Negundo). *fl.* purple; corolla ½in. to ¾in. long; panicles terminal, closely white-tomentose. June. *l.* three to five-foliolate; leaflets lanceolate, entire or crenate, glabrate above, white-tomentose beneath. *h.* 4ft. India, 1812. Stove shrub or small tree, closely allied to *V. trifolia*. *SYN. V. bicolor*.

**V. N. incisa** (cut-leaved).\* *l.* leaflets crenate-serrate or sub-pinnatifid. India, China, &c. Greenhouse. (*B. M.* 364, under name of *V. Negundo*.)

**V. trifolia** (three-leafted). Indian Wild Pepper. *fl.* varying from lavender to blue; corolla tomentose, ½in. to ¾in. long; panicles ½in. to 4in. long, oblong, white-tomentose, often leafy at base. July. *l.* simple and trifoliolate; leaflets sessile, obovate or obovate-oblong, entire, ½in. to 3in. long, sub-obtusely, glabrate above, clothed beneath with matted, scarcely stellate hairs. *h.* 4ft. India, Polynesia, &c., 1739. Stove shrub or small tree. (*B. M.* 2187.)

**V. t. variegata** (variegated). *fl.* violet-purple. *l.* opposite, with white margins. South Sea Islands, 1876. A slender, greenhouse shrub, with downy branches.

**VITICASTRUM.** A synonym of **Sphenodesma** (which see).

**VITICELLA.** A common name for **Clematis** *Viticella* (which see).

**VITICULOSE.** Sarmentaceous; furnished with vine-like twigs or suckers (viticule).

**VITIS** (the old Latin name used by Virgil, &c., perhaps from *vies*, to bind; in allusion to its clinging character). Vine. *Ampelopsis* and *Cissus* are here included by Bentham and Hooker, but for garden purposes these are kept distinct in this work. *ORD.* *Ampelidæ*. A vast genus (about 230 species) of stove, greenhouse, or hardy, tendrilled, sarmentose, often tall-climbing shrubs, mostly found in tropical and sub-tropical regions, but rare in tropical America. Flowers small, umbellate, cymose, paniculate, racemose or spicate, ebracteate, sometimes polygamous; calyx four or five-toothed or lobed; petals and stamens four or five; peduncles leaf-opposed or very rarely axillary, often near the tips of the branchlets. Berries ovoid or globose, one or two-celled; cells one or two-seeded. Leaves simple or compound, very rarely bipinnate; leaflets entire, serrated or dentate, sometimes pellucid-dotted. The Grape Vine (*V. vinifera*) has been cultivated since the days of Noah, and is supposed to have been introduced into this country by the Romans. Its principal products are: Wine, vinegar, brandy, raisins, and currants. The hardy species of *Vitis* are admirably grow up trees, or over strong-growing shrubs; also for trailing over massive rockwork, or along on the ground. They usually grow strong in good, loamy soil, and, consequently, require considerable space. The foliage is very ornamental at all times, particularly when changing colour in autumn. Vines requiring indoor treatment may be planted out, or grown in large pots, and trained to rafters, or a trellis. Propagation is easily effected by cuttings, inserted in pots, and placed in a close propagating-frame. Ripened wood, of the previous year's growth, will, in most, if not all, cases, root in a similar way to the Grape Vine; and, as the plants are gross feeders, they do best in a rich, loamy soil, with some manure intermixed. See also **Vine**.

**V. æstivalis** (summer).\* American Summer Grape. *fl.* with a Mignonette-like scent. May and June. *fr.* black, with a bloom, small, pleasant, ripe in October; fertile panicles long and slender, compound. *l.* simple, rounded and cordate, often variously lobed, woolly beneath, smoothish when old. *h.* 20ft North America, 1666. Hardy climber.

**Vitis**—continued.

**V. albo-nitens** (shining white). *l.* oval-oblong, acuminate, cordiform at the base, shining on the upper side and suffused with a brilliant, silvery-white tone of colour. Brazil, 1871. Stove climber. *SYN.* *Cissus albo-nitens*.

**V. amazonica** (Amazon). *l.* large, oval, acuminate, smooth, glaucous, red beneath, with the veins silvery above; young ones almost linear, their veins very strongly marked. Amazon, 1866. A pretty, stove climber. *SYN.* *Cissus amazonica*.

**V. antarctica** (Antarctic). Kangaroo Vine. *fl.* tomentose-pubescent; cymes dense, broadly corymbose, shorter than the petioles. July. *fr.* globular. *l.* simple, petiolate, ovate or oblong, mostly acuminate and slightly cordate, 3in. to 4in. by 1½in. to 2in., entire, sinuate or irregularly toothed, rather firm or almost coriaceous. Australia, 1790. Tall, greenhouse climber. *SYN.* *Cissus antarctica* (B. M. 2488).

**V. Bainesii** (Baines). *fl.* on glandular pedicels, cymose; peduncles terminal, as long as the stem. July. *l.* ternate, rather shortly petiolate (the lower ones sometimes simple); leaflets ovate or oblong, unequally serrated, penniveined; stipules twin. Trunk turnip-like, 1½ft. in circumference. *h.* 4½ft. Western tropical Africa, 1864. A dwarf, glaucous, succulent, stove tree. (B. M. 5472.)



FIG. 203. BRANCHLET OF VITIS DAVIDIANA.

**Vitis**—continued.

**V. cordifolia** (cordate-leaved). Chicken, Frost, or Winter Grape. *fl.* very sweet-scented. May and June. *fr.* blue or black, with a bloom, small, very acerb, ripening after frosts; panicles compound, long and loose. *l.* thin, not shining, cordate, acuminate, sharply and coarsely toothed, obscurely three-lobed, smooth or nearly so, and bright green on both sides. *h.* 12ft. North America, 1806. Hardy climber. *V. riparia* (B. M. 2429) is a mere form of this, with broader, cut-lobed leaves.

**V. Davidiana** (David's). *fl.* small. *fr.* violet, not edible. *l.* palmately lobed, the margins of the broad lobes toothed; petioles red, long. China. A vigorous-growing, hardy climber, speedily covering a large surface. See Fig. 203. *SYNS.* *Cissus Davidiana* (R. H. 1868, p. 29, f. 2), *C. platamifolia*, *C. rubricaulis*.

**V. Endresii** (Endres). *l.* cordate, deep velvety-green, the veins being of a deep purplish-brown. Costa Rica, 1875. A strong-growing, stove climber.

**V. gongylodes** (rounded). A synonym of *V. pterophora*.

**V. heterophylla humulifolia** (variable-leaved Hop-leaved). Turquoise-berried Vine. *fl.* minute, sub-umbellate; cymes on slender peduncles, sparingly divided. *fr.* of a fine, pale, china-blue colour, dotted with black, globular. *l.* on slender, red petioles, three to five-lobed, with a broad sinus at base; lobes acutely serrated, dark green and rugose above, pale beneath, with pubescent veins. Stems 2ft. to 5ft. long. North China and Japan, 1868. Hardy climber. (B. M. 5682.)

**V. hypoglauca** (glaucous beneath). *fl.* yellow, minute, but pretty, freely produced in axillary cymes. *l.* digitately five-foliate, oval or oblong, light green above, beautifully glaucous beneath when young. Tendrils wanting. Australia. Greenhouse or conservatory shrub.

**V. japonica** (Japanese). *fl.* green, disposed in panicles. *l.* compound; leaflets five, petiolate, the four lower ones bijugate, glabrous, roundish-oval, denticulate, the odd or terminal one larger, oval-elliptic, acuminate. Japan, 1875. A half-hardy climber, of vigorous, quick-growing habit. *SYN.* *Cissus japonica*. A variety called *marmorata*, with broad, yellow blotches on the leaves, has sported from this.

**V. javalensis** (Javali Mine). *fl.* bright scarlet, in compound cymes. *l.* much handsomer than those of *V. chontalensis*, simple, cordate, acuminate, mucronate-toothed, above green and beautifully velvety-pubescent, the midrib and veins purplish, below glabrous and purplish. Chontales Mountains, Nicaragua, 1869. A highly ornamental plant. *SYN.* *Cissus javalensis*.



FIG. 204. FRUITING BRANCHLET OF VITIS LABRUSCA.

**V. Labrusca** (classical name).\* American Plum Grape; Isabella Grape; Northern Fox Grape. *fl.* Mignonette-scented. June.

**V. capriolata** (tendrilled). *fl.* on pedicels ½in. to ¾in. long; cymes axillary or terminating in short, lateral branches, pedunculate; peduncles conspicuously bracteate. *fr.* black, globose, two to four-seeded, the size of a currant. *l.* five-foliate; petioles 1½in. to 2½in. long; leaflets 1½in. to 3in. by ½in. to 1½in., lanceolate or narrowly ovate or sub-ovate, acute or sub-acuminate, bristly-serrate in the notches. Temperate Himalayas. Hardy, with the protection of a wall, in the South of England.

**V. chontalensis** (Chontales). *fl.* scarlet, disposed in compound cymes. December. *l.* trifoliate, of a lovely green; lateral leaflets obliquely ovate, acuminate, terminal one elliptic, all toothed. Branchlets angular. Chontales Mountains, Nicaragua, 1869. An elegant, glabrous, stove climber. *SYN.* *Cissus chontalensis*.

**V. cirrhosa** (tendrilled). *fl.* minute, in dense cymes. *l.* digitately three to seven-foliate; leaflets succulent, sub-sessile, obovate, remotely dentate-serrate, quite glabrous in cultivation. Stems long, weak, brittle, fleshy, furnished with long, blif tendrils. South Africa, 1866. A straggling, glabrescent or pilose, greenhouse shrub.

**Vitis**—continued.

*fr.* dark purple or amber-coloured, large, with a tough, musky pulp, ripe in September or October; fertile panicles compact. *l.* simple, rounded and cordate, variably lobed, rusty-woolly



FIG. 205. FRUITS OF VITIS LABRUSCA.

beneath. Branchlets (and young leaves) very woolly. *h.* 12ft. North America, 1656. Hardy climber. See Figs. 204 and 205. (R. G. 765, 1.) *SYN. V. Thunbergii* (R. G. 424).

**V. lanata** (woolly). \* *fl.* green, small, forming a thyrsoid, paniculate cyme. May. *fr.* purple, four-seeded, round, the size of a large pea. *l.* cordate-ovate, shortly acuminate, usually 3in. to 6in. by 1½in. to 3in., sometimes larger, usually softly pubescent, but occasionally felted beneath or nearly glabrous. Himalayas, 1824. Hardy. The leaves of this species assume a beautiful scarlet colour in autumn.

**V. Lindeni** (Linden's). *l.* bright green, freely mottled with white between the veins. Branches terete, tendrilled. United States of Colombia, 1871. A smooth, shrubby, greenhouse climber. *SYN. Cissus Lindeni* (L. H. ser. iii. 2).

**V. macrocarpa** (gouty-stemmed). *fl.* four-parted, disposed in a rather broad corymb. April and May. *fr.* reddish-violet, the size of a pea. *l.* (at first plicate and white-tomentose), long-petiolate, the lowest one on the branch tri-, the rest five-foliate; leaflets ovate-elliptic or obovate, shortly stalked, toothed, cobwebby-pubescent. Trunk forming a large bulb, bi-trichasate, covered with smooth, green bark. *h.* 1ft. to 2½ft. South Benguela, 1864. A dwarf, stove tree, more curious than beautiful. (B. M. 5479.)

**V. planicaulis** (flat-stemmed). *fl.* four-parted; cymes sub-corymbose, with divaricating branches. May and June. *fr.* red (?), the size of a cherry. *l.* on petioles 4in. to 7in. long; leaflets 5in. to 8in. long, on stalks ¾in. to 1½in. long, oblong-lanceolate, slightly acuminate, obtusely serrated. India, &c. A vast, stove, glabrous climber. (B. M. 5685.)

**V. pterophora** (wing-bearing). \* *fl.*, cymes pedunculate, with thick, divaricate branchlets. Autumn. *l.* long-petiolate, trifoliate; leaflets ample, sessile, rugose-undulate, trapezoid- or rhomboid-obovate, acuminate, serrated, with impressed, reticulate nerves, the terminal one somewhat three-lobed, the lateral ones oblique or dimidiate-ovate, with the lower margin produced in a lobe; stipules fuscous-purple, ample. Each branch bears at its extremity (after ceasing to grow for the season) an elongated, fleshy tuber, 5in. to 6in. long, which finally drops off, and, on reaching the ground, under favourable circumstances, forms a new plant. Brazil. A unique, tall-climbing, villous, stove plant (B. M. 6803.) *SYN. V. gongyloides* (G. C. n. s., xix., p. 53).

**V. quadrangularis** (four-angled). *fl.* green, in small, shortly-stalked, glabrous cymes. Summer. *fr.*, berry globose, red, the size of a pea, very acrid. *l.*, when present, small, broadly-cordate or reniform. Stems glabrous, four-winged, very thick and fleshy, greatly contracted at the nodes, generally leafless. India, Java, &c. A curious and interesting, quick-growing, warm house climber.

**V. riparia** (river-bank). A form of *V. cordifolia*.

**V. striata** (striped). *fl.* greenish, inconspicuous, in cymes opposite the leaves. *fr.* reddish, the size of small peas. *l.* rather thick, dark green, digitate; leaflets sessile, oblanceolate, serrated, cuneate at base. Stems and tendrils glabrous. South Brazil and Uruguay, 1881. A beautiful, hardy, evergreen climber.

**V. Thunbergii** (Thunberg's). A synonym of *V. Labrusca*.

**V. vinifera** (wine-bearing). Common Grape Vine. *fl.* in loose or crowded, ovate or cylindrical racemes. June and July.

**Vitis**—continued.

*fr.* purple varying to white and green, watery or fleshy, sweet musky, or sour. *l.* lobed, sinuately toothed, naked or downy. South of the Caspian. Hardy climber. (B. M. Pl. 66; S. F. G. 242.) See also **Vine**.

**V. v. amurensis** (Amur). *l.* entire or three to five-lobed; young leaves woolly on both sides. (R. G. 339.)

**V. vulpina** (Fox Grape). Bullace; Muscadine. *fl.* densely disposed in small panicles. May. *fr.* purplish, without bloom, musky, ½in. to ¾in. in diameter, with a thick and tough skin, ripening early in autumn. *l.* shining on both sides, small, rounded, cordate at base, coarsely broad and blunt-toothed, seldom lobed. Branchlets minutely warty. North America. Hardy climber.

**VITTARIA** (from *vitta*, a riband; alluding to the narrow fronds). Including *Tenipopsis*. *ORD. Filices*. A genus comprising about thirteen species of tropical, stove Ferns. Fronds grass-like, sub-coriaceous, with free veins. Sori in continuous marginal or slightly intra-marginal lines. The species known in gardens are here described. For general culture, see **Ferns**.

**V. elongata** (lengthened). *fronds* 6in. to 18in. long, ½in. to ¾in. broad, the point acute or rather blunt, the lower part very gradually narrowed to the base; midrib faint or distinct; veins simple, immersed. *sori* quite sunk in a marginal groove, with two nearly equal lips opening outwards. Himalayas, Australia, &c. *SYNS. V. ensiformis, V. zosterifolia*.

**V. ensiformis** (sword-shaped). A synonym of *V. elongata*.

**V. lineata** (lined). Florida Ribbon Fern. *fronds* 6in. to 18in. long, ½in. to ¾in. broad, gradually narrowed downwards to a stout, compressed stem which passes gradually into the frond, the edges often reflexed; midrib distinct, raised; veins immersed, parallel. *sori* in a broad, slightly intra-marginal line in a slight furrow, the edge of the frond at first wrapped over it. West Indies, Guinea Coast, &c., 1793. *SYN. Tenipopsis lineata*.

**V. scolopendrina** (Scolopendrium-like). *fronds* 1ft. to 1½ft. long, ½in. to ¾in. broad, the point acute, the edge entire, the lower part very gradually narrowed to the base; midrib blackish, thick, grooved in front below; veins oblique, fine, parallel. *sori* in broad, continuous, sub-marginal lines, the firm, unaltered edge of the frond at first wrapped over it. New Guinea, Ceylon, &c. *SYN. Tenipopsis scolopendrina*.

**V. zosterifolia** (Zostera-fronded). A synonym of *V. elongata*.

**VITTATE**. Longitudinally striped.

**VITTMANNIA**. A synonym of **Willemetia** (which see).

**VIVIANIA** (named in honour of Domenico Viviani, 1772-1840, a professor and botanist of Genoa, &c.) *SYN. Macraea*. *ORD. Geraniaceae*. A genus embracing about eight species of stove or greenhouse herbs, sub-shrubs, or small shrubs, inhabiting extra-tropical or sub-tropical South America. Flowers regular, sub-fasciculate or corymbose-paniculate in the upper axils; calyx of five, rarely four, valvate lobes; petals five, rarely four, hypogynous, twisted; stamens ten, rarely eight, free, all bearing anthers. Leaves opposite, entire or often crenately or deeply toothed, usually snowy-tomentose beneath. It is doubtful whether the under-mentioned species are now in cultivation. They are, however, pretty, greenhouse shrubs, and thrive in a compost of loam, peat, and sand. Propagation may be effected by young cuttings, inserted in sand, under a glass.

**V. grandifolia** (large-leaved). *fl.* white or red; peduncles shorter than the leaves. July. *l.* grey and glandular beneath, with prominent veins. Branches pubescent. *h.* 1ft. to 2ft. Chili, 1832.

**V. parvifolia** (small-leaved). *fl.* rose-coloured; peduncles shorter than the leaves. July. *l.* snowy beneath, obscurely veined. Branches cobwebby. *h.* 1ft. to 2ft. Chili, 1832.

**VIVIANIÆ**. A tribe of *Geraniaceae*.

**VOANDZEIA** (Voandzou is said to be the name of the plant in Madagascar). *SYN. Cryptolobus*. *ORD. Leguminosae*. A monotypic genus. The species is a shortly-creeping, stove herb. Its flower-stalks, like those of *Arachis hypogaea*, bend down after flowering, and increase in length, so that the young pods are pushed into the earth, beneath which they ripen. For culture, see **Arachis**.

**Voandzeia**—*continued*.

**V. subterranea** (underground). Bombarra Ground Nut; Underground Bean. *fl.* pale yellow, partly unisexual, partly perfect; two upper calyx teeth or lobes connate; standard orbicular; peduncles short, axillary, few-flowered. July. *fr.*, pods irregularly sub-globose, two-valved. *l.* long-petiolate, pinnately trifoliate, stipellate. *h.* 3in. Tropics, 1823.

**VOCHISIA.** See **Vochysia**.

**VOCHYA.** A synonym of **Vochysia** (which see).

**VOCHYSIA** (*Vochy* is the Guiana name of *V. guianensis*). Sometimes spelt *Vochisia*. **SYNS.** *Cucullaria*, *Strukeria*, *Vochya*. **ORD.** *Vochysiaceæ*. A genus embracing about forty species of stove shrubs or often tall trees, inhabiting Brazil, Guiana, Eastern Peru, and New Grenada. Flowers yellow, odorless, rather large, in compound, elongated racemes or panicles; sepals five, connate at base, the posterior one large and often spurred; petals one to three, linear or spatulate, two of them smaller than the other; fertile stamen one; staminodia two; pedicels bibracteolate. Leaves decussately opposite or whorled, often coriaceous, sometimes prettily veined, as in *Calophyllum*; stipules small, subulate. Only a couple of the species have been introduced. Both are trees, thriving in a mixture of loam and peat. They may be increased by ripened cuttings, inserted in sand, under a glass, in heat.

**V. guianensis** (Guiana). Copai-yé-wood. *fl.*, spur spreading; racemes simple, erect, terminal, dense-flowered. August. *l.* opposite, obovate-oblong, shortly acuminate, glabrous on both sides. *h.* 12ft. and upwards. Guiana, 1822. (A. G. i. 6.)

**V. tomentosa** (tomentose). *fl.*, racemes terminal, loose, slightly nodding. August. *l.* opposite, oval-oblong, long-acuminate, attenuated at base, glabrous above, ferruginous-tomentose beneath. *h.* 25ft. Guiana, 1826.

**VOCHYSIACEÆ.** A small natural order of trees, often gigantic, with copious, resinous juice, rarely erect, sarmentose, or climbing shrubs, confined to tropical America. Flowers irregular, hermaphrodite, often large; sepals five, free or connate at base, or rarely adnate to the ovary, the two outer ones often smaller, the two anterior larger, the posterior often largest, spurred or gibbous at base; petals hypogynous, or inserted on the top of the calyx tube, one, three, or rarely five, when one is protruded between the blade of the anterior sepals, clawed; stamens inserted with the petals, usually fertile, the rest imperfect; filaments usually thick, excrecent, subulate; pedicels jointed and bracteate; inflorescence variable. Fruit usually capsular, rarely a winged samara. Leaves opposite, whorled, or alternate, shortly petiolate, coriaceous, quite entire; stipules small, reduced to glands, or wanting. Branches usually opposite or whorled. The order embraces seven genera, and about 100 species. Examples: *Qualea*, *Trigonía*, *Vochysia*.

**VOHIRIA.** A synonym of **Voyria** (which see).

**VOLKAMERIA.** A synonym of **Clerodendron** (which see).

**VOLKMANNIA.** A synonym of **Clerodendron** (which see).

**VOLUBLE.** Twining round some support.

**VOUAPA** (the Guiana name). **ORD.** *Leguminosæ*. A small genus (about three species) of stove, evergreen trees, natives of Guiana, now included, by Bentham and Hooker, under *Macrobium*. Flowers racemose; calyx four-cleft, with two opposite, stipitate bracteoles at the base; petal one, flat; stamens three. Leaves uninjugate. Only one species has been introduced. It thrives in a compost of sandy loam and a little peat. Propagation may be effected by ripened cuttings, inserted in sand, under a glass, in heat.

**V. bifolia** (two-leaved). *fl.* violet; calyx lobes spreading; stamens nearly equalling the corolla; bracts elevated-uninerved. May. *l.*, leaflets sessile, ovate, acuminate, oblique. *h.* 10ft. 1823. The proper name of this plant is now *Macrobium bifolium*.

**VOUAY.** A synonym of **Geonoma** (which see).

**VOYRIA.** (*Voyra* is the Guiana name of one of the species). **SYNS.** *Humboldtia* (of Necker), *Leiphaïmos*, *Lita*, *Vohiria*. **ORD.** *Gentianeæ*. A genus comprising about sixteen species of dwarf, leafless, stove herbs, found growing on putrid wood and leaves in tropical America and (one species) Africa. Flowers white, yellow, orange, or rarely blue or pink, solitary or few in a cymose cluster; calyx tubular or campanulate, four or five-toothed or lobed; corolla salver-shaped, with an elongated tube and four or five twisted, spreading lobes; stamens four or five, included; filaments filiform or very short. Scales minute, opposite or the lower ones rarely alternate. The species are probably not now in cultivation.

**VRIESIA.** Included under **Tillandsia** (which see).

**VULPIA.** Included under *Festuca*.

**WAAHOO.** See **Euonymus atropurpureus**.

**WACHENDORFIA** (named after E. J. Wachendorf, 1702-1758, a Dutch botanist, professor at Utrecht). **SYN.** *Pedilonia*. **ORD.** *Hæmodoraceæ*. A small genus (seven



FIG. 206. WACHENDORFIA THYRSIFLORA.

**Wachendorfia**—continued.

species have been enumerated, but probably not more than three are truly distinct as such) of greenhouse or half-hardy, tuberous-rooted, perennial herbs, confined to South Africa. Flowers in terminal panicles, often villous; perianth yellow, oblique, the tube wanting; segments narrow or obovate-oblong, the outer ones, especially the back one, dissimilar to the rest, decurrent to the pedicels; stamens three. Leaves few, ensiform or rarely linear, sometimes large, more or less plicate-veined. Stem erect, sometimes thickened at base. A mixture of very sandy loam and a little peat is well suited to the requirements of *Wachendorfia*. If planted out in a pit or frame, where protection from frost can be ensured, they will flower much stronger than if kept in pots. Little or no water should be given during the resting season. Propagation may be effected by offsets, or by seeds. Some of the species will thrive in the open air in the South of England if planted in a sheltered position.

**W. brevifolia** (short-leaved). *fl.* nodding; perianth crimson, intermixed with tawny-yellow, softly hairy outside; raceme loose. April. *l.* lanceolate, five-nerved, plicate, villous, distichous, about 6 in. long, falcately diverging. Stem 1 ft. high, green, hairy. 1795. (B. M. 1166.)

**W. hirsuta** (hairy). *fl.* drooping; perianth red in bud, golden-yellow when expanded; peduncles four or five-flowered, secund; panicle spreading; bracts villous. April. *l.* linear-ensiform, three-nerved, villous. Stem 1 ft. high, villous. 1687. (B. M. 614.) SYN. *W. villosa* (A. B. R. 388).

**W. paniculata** (paniculate). *fl.*, perianth golden-yellow, the segments pubescent outside, rubicund, obovate; pedicels racemose, secund, pubescent; peduncles spreading, three to five-flowered. April. *l.* ensiform, three-nerved, bifarious, one-third the length of those of *W. thyrsiflora*. Stem greenish, corymbose-paniculate. *h.* 1 ft. 1700. (B. M. 616.) *pallida* is a form with a pale yellow perianth. (B. M. 2610.)

**W. thyrsiflora** (thyrses-flowered).\* *fl.* in a terminal spike, the rachis angular; perianth yellow, the lobes cuneate-lanceolate; lower branchlets of the spike three or four-flowered. May. *l.* ensiform, five-nerved, glabrous. Stem nearly simple. *h.* 2 ft. 1759. See Fig. 206. (B. M. 1060.)

**W. villosa** (villous). A synonym of *W. hirsuta*.

**WAFER ASH.** A common name for *Ptelea trifoliata* (which see).

**WAHLBOMIA.** A synonym of *Tetracera* (which see).

**WAHLENBERGIA** (named after George Wahlenberg, of Upsala, 1780-1851, author of "Flora Lapponica," &c.). SYN. *Schultesia* (of Roth). Including *Cervicina* and *Edraianthus*. ORD. *Campanulaceæ*. A large genus (nearly eighty species) of greenhouse or hardy, annual, perennial, or woody-stemmed herbs, mostly natives of the Southern hemisphere, especially South Africa; a few inhabit the tropics of America and the Old World, and the Mediterranean region; and one species is broadly distributed over Western Europe. Flowers often blue and nodding; calyx tube adnate, hemispherical, turbinate, or obconical-oblong, the limb five, rarely three or four-parted; corolla campanulate, tubular, sub-rotate, or funnel-shaped, the limb shortly or rarely deeply five-cleft, very rarely three or four-cleft; stamens free of the corolla; inflorescence often irregularly centrifugal; peduncles terminal, lateral, or axillary, solitary or variously paniculate. Capsules erect, inferior or half-superior. Leaves alternate or rarely opposite. The best-known species are here described. For culture, see **Campanula**.

**W. albo-marginata** (white-margined). A synonym of *W. saxicola*.

**W. capensis** (Cape). *fl.* at first drooping, but at length nearly erect; corolla bluish-green outside, dark blue inside at the bottom, greenish at the origin of the violaceous lobes, spotted with black within the lobes at the recesses; peduncles elongated, one-flowered. July. *l.* ovate-lanceolate or lanceolate, pilose, irregularly toothed, 1 in. to 2 in. long. Stem 1 ft. to 1 ft. high. Cape of Good Hope, 1819. Half-hardy annual. SYNS. *Campanula capensis* (B. M. 782), *Roelia decurrens* (A. B. R. 238).

**W. capillacea** (capillary). *fl.* in a terminal, leafless panicle, on pedicels; corolla blue, 1 in. long, funnel-shaped. May. *l.* numerous, alternate, fasciated, linear-liliform, entire, 1 in. to

**Wahlenbergia**—continued.

1 in. long. Stems erect, 1 ft. to 1½ ft. high. South Africa, 1822. Greenhouse perennial.

**W. dalmatica** (Dalmatian). A synonym of *W. tenuifolia*.

**W. gracilis** (slender). Australian Harebell. *fl.* very variable in size and form; calyx three to five-lobed; corolla blue, purplish, or white, 1 in. to 1½ in. long, three to five-lobed. April. *l.* 1 in. to 2 in. long; radical ones spatulate, petiolate, toothed; cauline ones sessile, linear-oblong, entire, toothed, or sinuate, acute or acuminate, rarely spatulate. Stem 6 in. to 2½ in. high. New Zealand, &c., 1794. A slender, greenhouse annual. SYNS. *Campanula capillaris* (L. B. C. 1406), *C. gracilis* (B. M. 691; S. E. B. 45).

**W. hederacea** (Ivy-like).\* *fl.* one to a peduncle, leaf-opposed; corolla pale blue, 1 in. long, the lobes recurved. July and August. *l.* all petiolate, orbicular or cordate, angled or obscurely lobed, 1 in. to 1½ in. in diameter, the upper ones often opposite. Stems filiform, creeping. Europe (Britain). Annual. SYN. *Campanula hederacea* (Sy. En. B. 875).

**W. Kitabelii** (Kitabel's).\* *fl.* disposed in terminal, bracteate groups; corolla blue, with a tinge of purple; bracts acuminate, dentately sub-serrate. Summer. *l.*, radical ones crowded, linear-subulate, remotely denticulate. Stems purplish, beset with soft pill. *h.* 6 in. Transylvania. A tufted, hardy perennial. (B. M. 6188.)

**W. saxicola** (rock-loving).\* New Zealand Bluebell. *fl.* pale lilac, erect; corolla campanulate, thrice exceeding the calyx; scape solitary, long, one-flowered. June. *l.* all radical, usually rosulate, spatulate, long-attenuated to a flat, ciliated petiole, above usually hairy, entire or crenate-serrate, white and thickened on the margins. *h.* 2 in. to 8 in. New Zealand. Greenhouse perennial. (B. M. 6613.) SYNS. *W. albo-marginata* *W. vineiflora* (L. & P. F. G. ii., fig. 142).

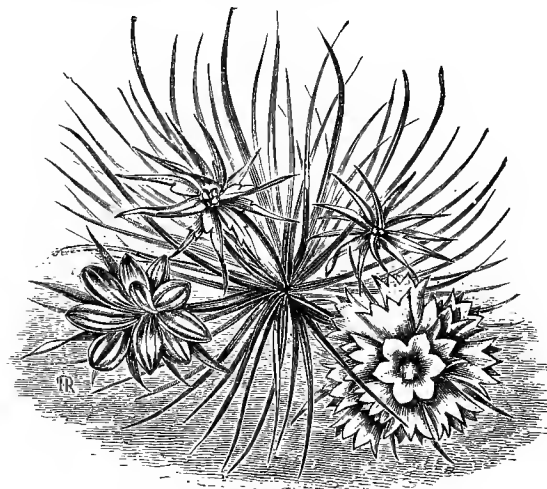


FIG. 207. WAHLENBERGIA TENUIFOLIA

**W. tenuifolia** (slender-leaved).\* *fl.* six to ten in a dense, terminal, bracteate tuft; calyx lobes bristly-ciliate; corolla violet-blue, white at the base. June and July. *l.* linear, entire, with bristly margins. Stems pilose, purplish, tufted. *h.* 1 in. to 6 in. Dalmatia, 1879. Hardy perennial. See Fig. 207. (B. M. 6482.) SYNS. *W. dalmatica*, *Edraianthus tenuifolius*.

**W. tuberosa** (tuberous-rooted).\* *fl.* white, marked on the outside with bright rose-red bands, numerous at the tips of the paniculate branches, 1 in. long, campanulate, erect. Summer. *l.* linear, acute, spreading, 1 in. long, one-nerved. Stems slender, erect, 6 in. to 2 ft. high, loosely branched. Juan Fernandez, 1875. A remarkably floriferous, tuberous-rooted, greenhouse perennial. (B. M. 6165; R. G. 1877, p. 213.)

**W. vineiflora** (Periwinkle-flowered). A synonym of *W. saxicola*.  
**WAHLENBERGIA** (of Blume). A synonym of *Webera* (which see).

**WAHOO.** See *Ulmus alata*.

**WAILESIA** (named in honour of G. Wailes, a great collector of Orchide). SYNS. *Dipodium* (now the correct name), *Leopardanthus*. ORD. *Orchideæ*. A small genus (about six species) of stove, terrestrial Orchids, natives



**Walesia**—continued.

of the Malayan Peninsula and Archipelago, the Pacific Islands, and Australia. Flowers frequently dotted, rather large, in simple racemes; sepals and petals sub-equal, free, spreading; lip erect, adnate to the column, slightly gibbous or very shortly saccate at base, three-lobed to the middle, the lateral lobes narrow or triangular, the middle one longer; column erect, semi-terete; pollen masses two. Leaves, when present, narrow, coriaceous. Stems leafy at base, or the floriferous ones leafless. Only two species have been introduced. For culture, see **Bletia**.

**W. picta** (painted). *fl.*, sepals and petals pale ochre within, externally yellow, with reddish-brown spots, oblong, acute; lip extended in a sac, trifold, white at base, the rest pale purple, obscurely striated; peduncle above 9 in. long, with a few distant sheaths, racemose at apex; bracts very short. *l.* oblong-lanceolate, acuminate. Adventitious roots ascending. Java, 1849. **SYNS.** *W. rosea* (P. M. B. xvi., p. 321), *Dipodium pictum* (R. X. O. 107, ii.-iv.).

**W. punctata** (dotted). *fl.* more or less red, usually spotted with purple; sepals and petals six to eight lines long; lip as long or rather longer, the basal pouch or gibbosity very short, the middle lobe obovate-oblong, twice as long as the erect lateral ones; raceme sometimes very short, occupying one-third of the stem. Stem erect, 1 ft. to 2 ft. high, leafless, with a few sheathing, loosely imbricated scales. Australia 1822. **SYNS.** *Dendrobium punctatum* (S. E. B. i. 12), *Dipodium punctatum* (B. R. 1980).

**W. rosea** (rose-coloured). A synonym of *W. picta*.



FIG. 208. UPPER PORTION OF PLANT OF WAITZIA AUREA.

**WAITZIA** (named in honour of F. A. C. Waitz, who travelled in Java, and wrote on the plants of that island). **SYN.** *Viraya*. Including *Morna*. **ORD.** *Compositæ*. A genus comprising half-a-dozen species of pretty, greenhouse, annual, Australian herbs. Flower-heads ("everlasting") in terminal corymbs, or rarely in oblong, leafy

**Waitzia**—continued.

racemes; involucre bracts all coloured and petal-like, imbricated in many rows; receptacle without scales; florets numerous, all hermaphrodite, tubular, five-toothed; achenes terminating in a slender beak. Leaves alternate, linear. The best-known species are here described. For culture, see **Celosia**.

**W. acuminata** (taper-pointed). A synonym of *W. corymbosa*.

**W. aurea** (golden).\* *fl.*-heads rather larger, fewer, and in a looser corymb, than in *W. corymbosa*; involucre golden-yellow or tinged with brown, the bracts distinctly exceeding the florets. Summer. *l.* resembling those of *W. corymbosa*. *h.* 1 ft. to 2 ft. 1835. See Fig. 208. **SYN.** *Morna nitida* (B. R. 1941).

**W. corymbosa** (corymbose). *fl.*-heads usually numerous, in a dense, terminal corymb; involucre pale or dark yellow, white, or light pink, the outer bracts passing into small scales. Summer. *l.* linear, the lower ones often 2 in. to 3 in. long, stem-clasping at base, the margins revolute. *h.* 1 ft. to 2 ft. 1834. Plant scabrous-pubescent or hoary. (B. M. 5443.) **SYN.** *W. acuminata* (R. G. 401).

**W. grandiflora** (large-flowered). *fl.*-heads bright yellow, much larger than those of *W. aurea*. Summer. *l.* much resembling those of *W. aurea*, but less hairy. *h.* 1 ft. to 2 ft. 1863.

**W. nivea** (snowy).\* *fl.*-heads rather large, usually few in a loose corymb; involucre bracts pure white or pink, or very rarely pale yellowish, not exceeding the florets. Summer. *l.* linear, scabrous-pubescent or almost glabrous. *h.* 1½ ft. 1836. **SYN.** *Morna nivea* (B. R. 1838, 9).

**W. Steetziana** (Steetz'). *fl.*-heads solitary or in loose corymbs, smaller than in *W. nivea*; involucre varying from a pure white to a pale or bright yellow, hemispherical, about ½ in. in diameter. Summer. *l.* linear. *h.* less than 1 ft. 1861. **SYN.** *W. tenella* (B. M. 5342).

**W. tenella** (tender). A synonym of *W. Steetziana*.

**WAITZIA** (of Reichenbach). A synonym of **Tritonia** (which see).

**WAKE ROBIN**. A common name for *Arum maculatum* and *Trillium grandiflorum*.

**WALDSCHMIDIA**. A synonym of **Limnanthemum** (which see).

**WALDSTEINIA** (named in honour of Count Francis von Waldstein, 1759-1823, a German botanist and author). Including *Comaropsis* (in part). **ORD.** *Rosaceæ*. A small genus (four species) of hardy, creeping, perennial herbs, with the habit of *Fragaria*, natives of Central and Eastern Europe, Northern Asia, and Eastern temperate America. Flowers yellow, rather large; calyx persistent, with or without five minute bracteoles; petals five, obovate; stamens numerous; pedicels often curved; scapes bracteate, two to five-flowered. Leaves alternate, long-petiolate, entire, lobed, three to five-cleft, or three to five-foliolate with orenate or incised leaflets; stipules rather large, membranous. Only three species call for description here, the North American *W. lobata* probably not being in cultivation. They are rather pretty plants, thriving in ordinary soil. Propagation may be effected by divisions, or by seeds.

**W. fragarioides** (Strawberry-like).\* Barren Strawberry. *fl.*, petals longer than the calyx. June. *l.* trifoliolate; leaflets broadly wedge-shaped, cut-toothed. North America, 1803. **SYNS.** *Comaropsis fragarioides*, *Dalibarda fragarioides* (B. M. 1567; L. B. C. 408).

**W. geoides** (Geum-like). *fl.* smaller than those of *Potentilla verna*. June. *l.* palmately three to five-lobed; lobes acutely toothed. Hungary, &c., 1804. (B. M. 2595.)

**W. trifolia** (three-leaved). *fl.*, petals rounded at the base, without auricles; ovary silky-villous. April and May. *l.* smaller than those of *W. geoides*; leaflets very shortly stalked, beset with long hairs. *h.* 4 in. to 6 in. Eastern Europe.

**WALKING LEAF**. A common name for **Scolopendrium rhizophyllum** (which see).

**WALKS**. Few things contribute more to the appearance of a garden than good, properly-proportioned Walks. Those that are to last in good condition must be properly made at first, as it is not an easy matter to keep repairing them, and, besides, it is seldom satisfactory. Various kinds of material are used, as much depends on what can be most readily procured. To make Walks in a proper

**Walks—continued.**

manner, and provide all the material, is rather an expensive proceeding, particularly on a large scale. Where gravel of a binding nature is procurable, it is generally preferred to other materials for the surface, as being most appropriate, and best suited for garden paths. One of the principal objects is to make Walks so that they can be used in all weathers without discomfort; but this is often somewhat difficult, for although the gravel may be of a nature which is in good condition in wet weather, it will often be rough and stony during continued drought. The amount of traffic which a Walk is likely to have over it will prove of assistance as a guide in its formation. Besides gravel, asphalt, concrete, burnt ballast, and other substances, are sometimes used for the surface. Something may generally be said in favour of Walks formed of the two first-named—*e.g.*, absence of weeds, durability when once made properly, and cleanliness at all times. Where it is necessary to have a hard, dry Walk, it may be preferable to make the surface of asphalt or concrete; but, as a rule, this is neither practicable nor desirable for garden paths where gravel is procurable in sufficient quantity. The question as to what the surface of a Walk shall be composed of, need not be further discussed, but left for settlement by individuals who have often to be guided by what materials they can procure.

Passing on to the formation of Walks, such materials as are best adapted will be referred to. One of the most important considerations is efficient drainage; this may be readily insured where the ground is undulated, but not so easily on a flat surface. Sometimes, Walks will drain themselves naturally without pipes, if the sub-soil is composed of gravel; but wherever they are sufficiently wide to be of importance, and there is clay beneath, a proper system of drainage is necessary. A good plan is to lay a row of ordinary 3in. drain-pipes the full length, either beneath the centre or near one side of the Walk, and conduct the water to the best available outlet. Catch-pits, with iron gratings on the top, should be placed on both sides near the edges, and these should be connected with the drain, so that any quantity of water may run away as fast as it enters. The width to be determined upon will vary, sometimes according to the length of the Walk, and at others to the extent of the space or inclosure through which it passes. In a large, walled-in kitchen-garden, for instance, it is usually found most convenient to have a Walk running parallel with the wall all round, allowing a space of 10ft. or 12ft. between for a border, on which vegetables, &c., may be cultivated, and two others intersecting each other in the centre of the inclosure, where it is very convenient to have a water basin for a constant supply. The intersecting Walks in this arrangement may be a little wider—2ft. or 3ft.—than those running parallel with the walls; this will distinguish them as being the principal ones. In very large gardens, it may be necessary to have more divisions than these, and, in addition, small, narrow paths, for subdividing the ground, are requisite; these latter are not usually gravelled. Flower-gardens, pleasure-grounds, terraces, &c., have Walks which vary greatly in width, as a matter of course; but the system of making may be carried out similarly in all.

The nearer the two edges are to a level or an equal incline, the easier is it to proceed. When laying out a new garden or grounds, some fixed points have to be made from which the levels are taken, and their positions must correspond somewhat to the natural disposition of the ground. Assuming that the width is determined, and a new Walk is to be made, the edges, of whatever description they are, must be first levelled and prepared. The level, or an equal fall from two fixed points, may be ascertained by the use of boring-rods; a straight-edge, 10ft. to 12ft. long, and a good spirit-level, are also requisite.

**Walks—continued.**

Edges require to be finished before the Walk is made, as they are a guide for gravelling, which it should not be necessary to alter afterwards. The mode of levelling with boring-rods for the edges and the Walk is similar; the highest and lowest points at the ends of any given length are fixed by pegs driven into the ground, and from these the proper height can be readily found throughout the intervening space. To insure firm edges, they should be made up with soil that is in a workable condition, and rendered firm by thorough ramming. New Walks, that are to be 10ft. or more wide, require excavating to a depth of from 9in. to 12in., the lowest point being made in the centre or wherever the drain-pipes are intended to be laid. When these are inserted, about 6in. of rough material, such as clinkers or old bricks, should be placed above them; then a layer of something in the way of rough ballast, which should be well rammed, and the surface left in the shape which it should present when finished; and then 2in. or 3in. of fine gravel should be laid over the top. This will become much less in bulk so soon as it is trodden over and the roller applied.

The proper height of the Walk, when finished, may best be indicated by driving in wooden pegs down its centre, about 10ft. apart: the positions of these may be obtained by the levelling instruments in the same way as for the edges, and the pegs can be pulled up as the finishing coat of gravel is put on. All Walks should be kept higher in the centre than at the edges, in order that rain-water may pass readily into the gratings, and efficient surface drainage be insured. The height at which it is advisable to fix the centre of a Walk above the edges depends on the width. Walks less than 8ft. wide, and with a fall lengthways, will generally be sure to drain if the centre is kept on the same level as the verge or edging, provided the surface is made so that the gravel at the edges is about 2in. lower when the work is completed. The iron gratings may be placed 2in. below the level of the edges in almost all walks. The centres of 8ft. or 10ft. walks should be raised 1in. above the edge level, and, as a general rule,  $\frac{1}{2}$ in. more may be added for every 2ft. width, so that a walk 28ft. or 30ft. wide would require its centre up 4in. to 6in. above the edges, to prevent water accumulating there instead of passing to the gratings. These heights will not be found too great a proportion for the width; this always needs consideration, or the surface will not be comfortable to walk upon.

Before proceeding to put on the finishing coat of gravel, the rough material beneath must be rammed quite firm, and consolidated about equally throughout. The top gravel should be levelled with a wooden rake, used by a workman who, from experience, is able to do it properly. The want of a spit may cause a hollow place in the surface, and improper levelling has an equally objectionable effect, which will be readily apparent when rain comes. As the person levelling proceeds, another should be treading the surface crossways, and removing the levelling pegs, which, by this time, have served their purpose. A second rake must then follow, to remove any stones and inequalities caused by treading. A light roller may then be used, and afterwards a heavy one, if the Walk will carry it without the gravel clinging. It is advisable to get new gravel firmly rolled, if possible, before rain comes, as if water gets into it when loose, it often takes a long time to get a solid surface. To keep gravel Walks in good order, they must be rolled frequently when the weather allows, both in summer and winter. If the surface is too dry, but little good would result from rolling, and if too wet it might cling, or be positively injured; some judgment must, therefore, be exercised in selecting the proper times when rolling may be beneficially practised.

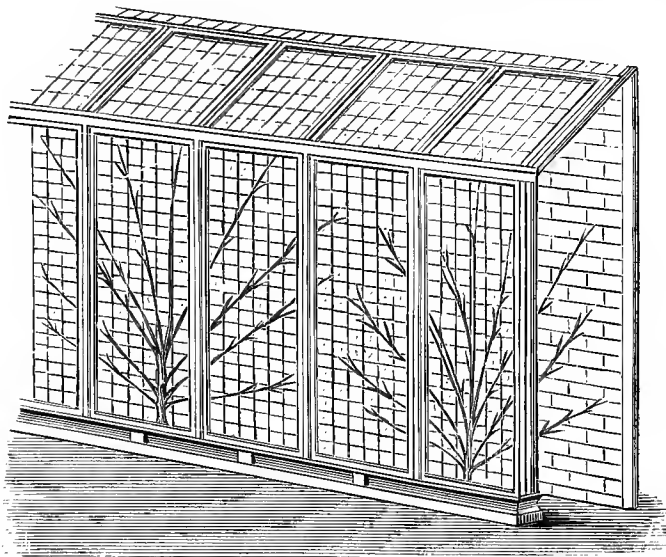


FIG. 209. WALL CASE.

**WALL CASE OR FRAME.** A general term applied to a glass protection sometimes put over such fruit-trees as Apricots, Peaches, and Nectarines, in unfavourable localities, where the fruits cannot be depended upon to ripen outside. A Wall Case or Frame (see Fig. 209) is, practically, an unheated, narrow house; but if glass protection without heat is unsafe against the injury caused by spring frosts, it would be preferable to incur the further expense of having a house which, for erecting, would, in many cases, not cost very much more, when the wall was already at command, and insert sufficient hot-water pipes to keep out frost. The interior would then be available, so far as space permitted, for accommodating many other plants in winter which merely require a slight protection.

**WALL CRESS.** See *Arabis*.

**WALL FERN.** See *Polypodium vulgare*.

**WALLFLOWER.** See *Cheiranthus Cheiri*.

**WALLFLOWER, ALPINE.** A common name for *Erysimum ochroleucum* (which see).

**WALLICHIA** (named after Dr. Nathaniel Wallich, 1786-1854, a Danish botanist, and author of several valuable works on Indian plants). *SYNS.* *Harina*, *Wrightia* (of Roxburgh). *ORD.* *Palmæ*. A small genus (two or three species) of East Indian, dwarf, tufted, stoves Palms. Flowers yellowish, mediocre, monœcious or rarely polygamous, bract-eate and bibracteolate; spathes very numerous, slenderly coriaceous, the lower ones narrower, tubular, the upper ones boat-shaped, complete, imbricated; spadicee shortly pedunculate, the males drooping or decurved, ovoid, much-branched, dense-flowered, the females looser, erect. Fruit reddish or purple, ovoid-oblong, one or rarely two-celled and seeded. Leaves densely fascicled, in one species terminal and distichous, furfuraceous, unequally pinnatisect; segments solitary or the lower ones fascicled, cuneate at base, oblong, obovate, or oblanceolate, erose-toothed, the terminal one cuneate; petioles slender, laterally compressed; sheaths short, cut at the margins and furnished with long

**Wallichia**—continued.

hairs. The species requires to be grown in a strong, rich soil. Propagation may be effected by seeds, when procurable; or by gradually separating the suckers, so as to allow them to make sufficient root before they are quite detached.

**W. caryotoides** (Caryota-like). \* *fl.*, males yellowish-white, covering the spadix branches; females few, amongst the males near the bases of the branches. July. *fr.* ovate-oblong, the size of a nutmeg. *l.* few, alternate, petiolate, 3ft. to 8ft. long; leaflets sessile, 1ft. to 1½ft. long, the lower ones in opposite fascicles, the upper ones mostly solitary and alternate, all wedge-shaped, premorse at apex, deep shining green above, whitish beneath. India, 1825. See Fig. 210.

**W. densiflora** (dense-flowered). \* *fl.*, male spadices enveloped in large, imbricated spathes, of a dark purple, streaked with yellow; these separate, and then a dense cluster of nearly white female spadices, with violet-coloured ovaries, appears. *l.*, lower pinnae binately fascicled, whitish below, the rest solitary, sinuate-lobed or toothed. Plant stemless. *h.* 12ft. Assam, 1840. (B. M. 4584.)

**WALLISIA** (of Regel). Included under *Tillandsia* (which see).

**WALLISIA PRINCEPS** (of Regel). A synonym of *Lisianthus princeps* (which see).

**WALL PENNYWORT.** A common name for *Cotyledon Umbilicus* (which see).



FIG. 210. WALLICHIA CARYOTOIDES

**WALL PEPPER.** See *Sedum acre*.

**WALL PLANTS.** These are very numerous, if the whole of the subjects requiring or benefiting by wall accommodation is considered. Kitchen-garden walls are requisite for the cultivation of fruit-trees that will not succeed in the open; and these are rarely given up to other plants, excepting such as Tomatoes, which, in favourable aspects, succeed during summer in any intervening spaces. The term Wall Plants is usually meant to have reference to those subjects which, from their natural habit of growth, require a wall; but it may also include very many others that, from their quick-growing nature, may be utilised for rapidly covering a large surface, or, from being more or less tender, are cultivated with greater certainty, and brought to greater perfection, by the shelter which a wall affords. Walls in greenhouses, stoves, and most other glass structures, may also be utilised for the production of some crop, or covered with some plant to impart a much better appearance than would otherwise be the case. Of hardy plants that succeed admirably on walls, the following, amongst many others, may be mentioned: *Aristolochia Sipho*, *Chimonanthus fragrans*, many species and hybrids of *Clematis*, *Cotoneasters*, *Crataegus Pyracantha*, *Escallonias*, *Euonymus*, *Forsythia suspensa*, *Garrya elliptica*, *Ivies*, *Jasminum officinale* and *J. revolutum*, *Loniceras*, *Magnolias*, *Pyrus japonica*, *Roses*, *Tecoma radicans*, hardy Vines, Virginian Creepers, *Wistaria sinensis*, &c. Camellias are sometimes grown very successfully as Wall Plants in greenhouses; and apart from their flowers, the foliage is always attractive. Strong-growing kinds of Tea Roses do well on walls in any cool house, or on the back wall in a peach-house. Fuchsias, *Heliotropes*, *Jasminums*, *Passifloras*, &c., are well-known wall-furnishing plants. *Ficus stipulata* will cover a wall in a cool house or stove with green verdure as dense as Ivy does outside; it is, therefore, a very desirable subject.

**WALLROTHIA** (of Roth). A synonym of *Vitex* (which see).

**WALLROTHIA** (of Sprengel). Included under *Seseli* (which see.)

**WALL RUE.** See *Asplenium Ruta-muraria*.

**WALLS.** These are requisite for the proper cultivation of fruit-trees and numerous other subjects which require shelter and a warm situation; and the less favourable aspects which must of necessity be presented by one, or sometimes even both of the surfaces, may also be utilised for some purpose. In a kitchen garden the Walls serve as a boundary for the inclosure; and as, during sunshine, they accumulate a considerable amount of heat, which is given off when the air becomes cooled, most of the trees on southern aspects, at any rate, are in a warmer temperature even at night than they would be in the open ground. Amongst the principal fruits which in nearly every locality require Wall protection are Apricots, Figs, Nectarines, and Peaches. Morello and dessert Cherries, dessert Pears, and Plums, are also best, as a rule, on Walls; the Morello succeeds well in a north aspect, which is a great advantage.

The actual work of construction does not usually come within a gardener's province, but he has, not unfrequently, to propose the dimensions or give instructions how the work is to be executed. In a large garden, the Walls should be 10ft. to 12ft. high—the top of anything less than this would soon be reached by any of the fruit-trees named above. For a small garden, these heights might be too much for the inclosed area to be proportionate, and 8ft. would then be sufficient, but high Walls are always far superior to low ones. The materials commonly used are bricks (the dimensions of which are fairly uniform in all localities) and mortar. It is most important

**Walls—continued.**

that garden Walls be substantially built, and the foundations made to rest on a solid bottom; the weight will, in course of time, cause settlements, if any portion of the ground is of a different character, and the base is, consequently, not of an equally solid description throughout. The foundations should be, at the base, quite double the width of the wall that they are intended to support. The proper thickness depends considerably on the height. Walls that are only to be carried 6ft. or 8ft. high may be constructed, if the material and workmanship are good, in 9in. work—that is, the length of one brick. Higher Walls than these should not be less than 14in. thick, while 18in. is much more substantial, and better in all ways. These dimensions are readily obtained by using bricks: 14in. allows the length of one and the width of another, and 18in. the length of two, for the total thickness. Walls are sometimes constructed with less solidity than this, and supported by occasional buttresses on one or both of the sides; these are objectionable unless really needed, because of their interference with the proper training of trees, and it may be pointed out that they swallow up a considerable quantity of bricks that would help to build a thicker and more substantial Wall, and one which would be more satisfactory in the long run. All kitchen-garden Walls should be provided with a coping projecting over from 2½in. to 3in. on each side, and grooved beneath the under side of the projection for drip. Stone, if not too expensive, is the best material for copings; the entire part at the top should be slightly higher than the sides, so that water may pass off readily. For the protection of tender fruit-blossoms in spring, when this is necessary, it is better to put up a temporary board coping from 6in. to 9in. wide, on brackets fixed to the Wall, than to make the permanent one too wide. This can easily be removed when no longer required; and if the edge of the board is placed beneath the stone, and the brackets are of triangular shape, there will be no danger of drip on the blossoms. Walls should always be kept in good repair: the holes caused by nailing in the mortar, and larger ones often caused by the action of frost, are invariably harbours for insects. Where insects are very numerous, as is often the case in old Walls, a dressing of fresh lime and sulphur, thickened with a little clay, and made a dark colour by the addition of sufficient soot, may be annually used, if desired. It should be applied during the time the trees are bare, when a little falling on them will seldom do any harm. See also **Garden**.

**WALLWORT.** An old name for *Sambucus Ebulus* (which see).

**WALNUT** (*Juglans regia*). The common Walnut is a well-known tree, fine in foliage as an ornamental subject for planting in parks, paddocks, &c., and useful for its fruits, both in the young and ripened state, and for the timber, which is largely employed by cabinet-makers and others, and for the purpose of making gun-stocks. Propagation is effected by seeds; also by budding, grafting, and inarching for perpetuating varieties. Seeds of Walnuts designed for timber-trees, are best sown where the trees are intended to develop, if this is practicable; or they may be stratified through winter, and planted in nursery rows, about 2ft. apart, in February or March following. The young trees may either be transplanted in the autumn, or allowed to remain a year longer; they each form a long tap-root, which proceeds straight down, and if transplanting is intended, it must not be too long deferred in the first place. Ring-budding and shield-budding, with a pushing eye, and also whip and cleft grafting, are successful methods of propagation, and all are performed while the sap is in active circulation. Walnut-trees succeed in any fairly good soil; if of good depth and resting on a gravelly bottom, it is

**Walnut**—*continued*.

to be preferred. The delicate young shoots and fruits are liable to be much injured by late spring frosts.

Walnuts for pickling should be gathered when the shell is quite soft, so that a needle will readily pass through.



FIG. 211. FRUITING BRANCH OF WALNUT (*Juglans regia*).

The ripe fruits (see Fig. 211) drop, and their husks open and disclose the nut in a way which is generally familiar. Squirrels will collect large quantities and store them; if there are any of these animals about, the crop must be secured as soon as ripe, or the predators destroyed. Walnuts may be preserved in several ways for use during winter: dried and packed in clean jars or casks, with alternate layers of sand, they keep well; or placed in jars with close-fitting lids, and buried in the ground. Placing them in jars and sprinkling them with salt, and burying in oak sawdust, are other methods of preservation which have been recommended.

**DISEASES, &c.** The Walnut is not affected by any disease of sufficient importance to call for special remark; though several insects and Fungi attack the tree and fruit, they do no appreciable harm in England.

**SORTS.** Small-fruited varieties are best for growing to produce fruit. Besides the common Walnut, which is an abundant bearer, the following are most desirable:

**DWARF PROLIFIC**, a dwarf-growing variety which bears abundantly when quite small. **HIGHFLYER**, early, of medium size, thin-shelled. **THIN-SHELLED**, an excellent variety, with a thin, tender shell, well filled; of better quality than the common variety.

**WALNUT-TREE, INDIAN.** A common name for *Aleurites triloba* (which see).

**WALSURA** (altered from *Wallursi*, the Telinga name). **ORD.** *Meliaceæ*. A genus comprising about a dozen species of stove, evergreen trees, limited to India and the Indian Archipelago. Flowers small; calyx short, five-cleft or five-parted; petals five, ovate-oblong, spreading; filaments ten or eight; panicles axillary and terminal. Leaves one to five-foliate; leaflets opposite, quite entire, pale beneath. Perhaps *W. robusta* is not now in cultivation. *W. piscidia* is met with in hotanic gardens. They require similar treatment to that recommended for **Chloroxylon**.

**W. piscidia** (fish-poison). *fl.* sordid-yellow; petals imbricated; staminal tube half the length of the petals, equally ten-cleft. June. *l.* 2 in. to 7 in. long; leaflets 1 in. to 4 in. long,  $\frac{3}{4}$  in. to 1  $\frac{1}{2}$  in.

**Walsura**—*continued*.

broad, sub-ternate, elliptic, obtuse, often retuse, glabrous, shining, pale beneath *h.* 20 ft. India, 1850. The bark acts as a fish-poison.

**W. robusta** (robust). *fl.* white,  $\frac{1}{2}$  in. long; panicles nearly as long as the leaves, densely puberulent. June. *l.* 6 in. to 12 in. long; leaflets five, sometimes three, ovate or elliptic, acuminate, shining. *h.* 20 ft. and upwards. India, 1827.

**WALTHERIA** (named in honour of Aug. Fried. Walther, 1688-1746, Professor at Leipzig). **ORD.** *Sterculiaceæ*. A genus embracing about sixteen species of stove, stellate-pubescent herbs, sub-shrubs, or rarely trees; one is broadly dispersed over temperate regions, two are found in Africa, two in Oceania, and the rest are American. Flowers often rather small, glomerate or cymose in the axils, or disposed in terminal heads, racemes, or panicles; calyx five-cleft; petals five. Leaves serrated. The species possess little beauty, and are probably now unknown to cultivation.

**WAMPEE-TREE.** See **Cookiea**.

**WANDERING JEW.** See *Saxifraga sarmatosa*.

**WANGHEE OR WHANGEE CANE.** See *Phyllostachys nigra*.

**WARATAH-TREE.** See *Telopea speciosissima*.

**WARDEN.** An old name for a variety of Pear used in making "Warden pie."

**WARDIAN CASE.** Wardian Cases are invaluable for packing pot-plants that have to travel long sea voyages. By their aid many new and rare plants of foreign climates are annually imported into this country, and others which we possess are exported in a similar way. The importation and exportation of plants in Wardian Cases is mostly conducted by some of the principal nurserymen and those in charge of botanic gardens, who usually make special arrangements, so that what they send away or have sent to them shall be of sufficient value and importance to warrant the outlay incurred, which is often somewhat considerable. Certain seasons are also selected for sending plants to particular countries abroad, such as are best calculated to favour a safe voyage in respect of the effect of climatic conditions on the plants during transit. Wardian Cases are made in different sizes to hold small or somewhat large plants, as the case may be. The pots are usually packed in soil or cocoa fibre, and held in position by narrow strips of wood, which are firmly secured by nailing them close down on the top of each inside the Case. The roof, if it may be so called, is made of two frames which fit on the ends and meet together at the top, where they form a ridge. They are glazed, and the glass protected by thin pieces of wood, which are fixed a short distance apart, so as to allow as much light as possible to pass to the plants inside. One or both of these sash-frames is movable, and may be unscrewed and taken off for the purpose of packing or unpacking. When travelling, Wardian Cases are nearly air-tight, so that but little evaporation or change of air can take place, only a small circular hole, covered with perforated zinc, being allowed at each of the ends near the top. The frames in which the glass is embedded are made air-tight by being fitted up with putty before being screwed. Instructions are invariably given as to the part of a ship where Wardian Cases should be placed during the voyage.

Other kinds of Wardian Cases are those used for plant-culture in drawing-rooms, &c., and in ferneries, for the special accommodation of Filmy Ferns, and such as require a very moist atmosphere. The former, with

**Wardian Case**—*continued.*

the stands on which they are placed, are usually rendered ornamental for associating with the surroundings, and have a fine appearance when filled with green Ferns, small foliage plants, and Lycopoda. In Ferneries, such cases may be quite plain externally; they, of course, answer their purpose equally well for preserving moisture inside.

**WARENCE.** An old name for Madder (*Rubia tinctorum*).

**WARMOT.** An old name for Wormwood (*Artemisia*).

**WARREA** (named by Lindley in honour of its discoverer, Frederick Warre, who sent plants to the Loddiges, by whom it was figured under the name of *Maxillaria Warreana*). ORD. *Orchideæ*. A small genus (according to Bentham and Hooker, one or two species) of stove, terrestrial Orchids, natives of Brazil, Pern, Columbia, &c. Flowers showy, shortly pedicellate; sepals and petals broad, concave, the lateral ones oblique at base, adnate to the foot of the rather long, clavate column; lip affixed to the foot of the column, sessile, very shortly contracted towards the base and incumbent, at length erect, broad, and concave, the lateral lobes scarcely prominent, the middle one expanded, entire or bifid, the disk having elevated, fleshy lines; pollen masses four; racemes elongated, loose; scapes leafless, many-sheathed, tall, simple; bracts short. Leaves few, distichous, elongated. Stem leafy. *W. tricolor* and its variety require similar treatment to that recommended for *Phaius*. Several species formerly included here will now be found under *Zygopetalum*.

**W. tricolor** (three-coloured). \* *fl.* rather large, globose, drooping; sepals and petals yellowish-white, the two lateral sepals below ending in a blunt spur; lip yellow and deep purple, white at the edge, obovate, cucullate at base, the disk having three ridges; scapes lateral, purple at the joints, about 2ft. high, bearing an eight to ten-flowered raceme. June and July. *l.* long-petiolate, lanceolate, plicate. Pseudo-bulbs oblong, terete attenuated, jointed. Brazil, 1843. (R. X. O. 24.) SYN. *Maxillaria Warreana* (B. M. 4235; L. B. C. 1884).

**W. t. stapelioides** (Stapelia-like). *fl.*, sepals and petals barred with brown internally; lip with a broad, purplish-brown stripe in front. New Grenada, 1872.

**WARSZEWICZELLA.** Included under *Zygopetalum* (which see).

**WARTED GOURD.** See *Cucurbita Pepo verrucosa*.

**WARTS.** Hard or firm excrecences.

**WASHINGTONIA** (so called after George Washington, the great American patriot). ORD. *Palmæ*. A small genus (one or two species) of tall, greenhouse Palms, natives of South California and Arizona. Flowers white, hermaphrodite; spathes elongated, membranous, cut, glabrous; spadices elongated, copiously paniculate-branched, the branches slender and flexuous. Fruit black, small, ellipsoid, one-celled, one-seeded. Leaves terminal, ample, spreading, orbicular, flabellately plaited, cut nearly to the middle; the segments induplicate, with filiferous margins; petioles elongated, robust, flat-convex, the margins very spiny. For culture, see *Chamærops*.

**W. filifera** (thread-bearing). \* *fl.* perfect, solitary, nearly sessile upon the slender branches of the panicle. *l.* circular, flabelliform; petioles armed with stout, hooked, marginal spines; ligule large and adpressed, coriaceous, glabrous; rachis short; blade deeply cleft along the upper folds and copiously filiferous. Flowering stems 8ft. to 10ft. long. A tree 20ft. to 40ft. high. California. SYN. *Brahea filamentosa*, *Pritchardia filamentosa*, *P. filifera*.

**W. robusta** (stout). *l.* sub-orbicular; petioles armed with strong spines, sheathing at the base; limb fan-shaped, plaited, entire to the middle, then divided into narrow, acute rays, bordered with white filaments. *h.* 6ft. to 7ft. California. (R. H. 1885, p. 403.)

**WASHINGTONIA** (of Winslow). A synonym of *Sequoia* (which see).

**WASHINGTON THORN.** See *Crataegus cordata*.

**WASPS.** These insects are too well known to every one to require any description of their form, colour, markings, or power of stinging. There are, however, several species of Wasps in Britain. Though they agree in so many respects that no one can fail to recognise them as Wasps; and though they are so like one another in form, in colour, and in markings that it is not very easy for any one but an entomologist to distinguish them, yet they differ in the places in which they make their nests, and in the means to be employed against them when they become troublesome in gardens.

The True Wasps, belonging to the genus *Vespa*, are all social insects, like their kindred, the Honey Bees; but, unlike the latter, there is little difference between the



FIG. 212. COMMON WASP (*Vespa vulgaris*).

sexes in outward appearance. The common Wasp (see Fig. 212) is a good representative of the whole group, the sexes differing in little but size; and the other species being distinguished chiefly by the forms and sizes of the black markings that are scattered on the yellow ground-colour, and by the presence in some of rusty-brown spots on the sides of the body. The Wasps belong to a division of the *Hymenoptera* (which see), which have the fore wings folded lengthwise, like a fan, when at rest, and the hind wings hidden below them. This division, besides the true Wasps, includes a large number of insects, known as Solitary Wasps, that resemble them in general form, and to some extent also in colour: but anyone familiar with the appearance of the common Wasp will find no real difficulty in distinguishing the one from the other; while to state the characteristic distinctions would require more space than is here available, without affording any corresponding advantage. The Solitary Wasps are so named because they do not live in societies like the true Wasps; and each female among them forms the cells or chambers to be occupied by the larvæ hatched from the eggs laid in them, and she stores the cells with the proper food. This frequently consists of larvæ of small Moths, or of other insects; and the Wasps that capture these should be protected by gardeners as far as possible, as they assist in the destruction of noxious insects. The Solitary Wasps make the cells for the protection of their larvæ in the most varied situations. Some females dig burrows in sandy soil, and at the end of each burrow form a cell, which is stocked with provisions, among which an egg is placed. Others tunnel in the pith of dead Rose-twigs, &c., while some take advantage of the burrows of other insects, or of any crevice, or even of empty snail-shells, in which to form the cells; and still others build mud cells, often of peculiar forms, against stones or on plants. It would be impossible to give a full account here of the exceedingly diverse habits observed among the Solitary Wasps. In regard to them it need only be added that none are injurious to gardens, while several are useful, as stated above.

To return to the Social or True Wasps, belonging to the genus *Vespa*. They are of doubtful reputation with gardeners, but are decidedly more hurtful than beneficial in gardens. It is true that they are voracious creatures, and feed largely on other insects, and that they destroy considerable numbers of noxious or troublesome species; but the benefits conferred by them in this way are more than counterbalanced by the injury they do to ripe fruits. They are very partial to apricots and plums; but, where these are not to be obtained, they attack gooseberries,



**Wasps**—continued.

leaving little but empty skins. They are extremely numerous in some seasons, while in others scarcely a Wasp can be seen. A brief account of their life-history will suggest suitable methods for lessening their numbers.

The Common Wasp (*Vespa vulgaris*) may be selected as representative of the genus in its life-history. Towards the close of autumn by far the greater number of the Wasps die; and only a few females survive the winter. The Wasps one sees in spring, exploring holes and crevices in the ground, in old walls, in heaps of rubbish, or in tree trunks, are females in search of secure retreats in which to form nests; and each one killed at this season prevents the formation of a nest during the summer. Those that find suitable localities enlarge them, if necessary, to the size required for the commencement of the nests. A very favourite locality is a mouse-hole. Each female works by herself for a time in forming her nest, the coverings and cells in which are made of a kind of paper. This substance, it is believed, is prepared from the fibres of wood rasped by the Wasps from the surface of naked trunks or of posts, rails, or other articles, moistened with a fluid from the mouths of the insects, and made into a paste. The Wasp fixes a short pillar of this to some firm body—e.g., the root of a plant, or a stone, in the roof of the hole—and then forms two or three cells, mouth downwards, on the free end of the pillar, and builds an umbrella-like roof above them. In each cell an egg is laid; and, after a short time, the larvæ are hatched, and require to be tended and fed by the parent Wasp. The food given to the larvæ while young is chiefly honey, taken from Bees, or from ripe fruits; but, when the larvæ are older, they are fed on flies and other insects. When Wasps can gain access to grocers' and butchers' shops, they are apt to become troublesome in their efforts to obtain sugar and animal food from the supplies in the shops, instead of from the usual sources. As the larvæ grow, the cells have to be enlarged around them; and at last they become full-fed, spin over the



FIG. 213. PUPA OF WASP.

opening of the cell, and pass into the state of pupæ (see Fig. 213). The female Wasp continues to form new cells, and to feed the young brood; and, as soon as the perfect insects have emerged from the pupæ, they assist her in her work. The Wasps that develop in early summer are incapable of laying eggs, and are called neuters; they are, in reality, females in which the reproductive organs remain undeveloped. As the number of cells is increased, the size of the hole must be enlarged, and the outer coverings of the nest removed and relaid, of a size to permit of the nest in its new dimensions being contained within them. As the number of Wasps is augmented from the young broods, the nest increases more and more rapidly in size, and combs are added, each new one being suspended from its predecessor by numerous supports of the papery material, strengthened by an extra allowance of the gluey secretion from the insects' mouths. Space is left between the combs to permit the Wasps to move about freely, and to gain easy access to every cell. Towards the end of summer, both males and females are developed, in addition to the workers or neuters, to secure the perpetuation of the species. When the winter is near, the Wasps have been observed to tear open the cells containing larvæ, which they then destroy. The instinct to do so is a merciful one, as the larvæ would otherwise perish of starvation, from the pain of which they are saved by this speedy mode of death. Besides *V. vulgaris*, certain other species of the genus make their nests in holes; but others suspend their nests from the branches of trees or bushes (see Fig. 214). Except in situation, the latter nests agree

**Wasps**—continued.

with those formed in holes, the outer covering being made sufficiently strong to prevent injury from the weather; these nests are entered by a small hole below, or on one side near the bottom.

The Hornet (*V. Crabro*) differs from its congeners in its larger size. It is not scarce in the South of England, where it nests in hollow trees or in outhouses. The material employed by Hornets in making the paper for their nest is usually rotten wood. These insects sting much more severely than Wasps; but they feed almost wholly on other insects, including Wasps, and must be regarded as friends in the garden.

**Remedies.** In districts where Wasps are very numerous, it is often necessary to destroy them and their nests, in order to protect the fruit, and to prevent annoyance from their entering houses, and using their stings. Prevention is best secured by encouraging the capture of the females in spring, as this prevents them from commencing the nests. The numbers may also be lessened either by capturing the insects, or by destroying the nests. Wasps may be caught in summer and autumn in various simple traps

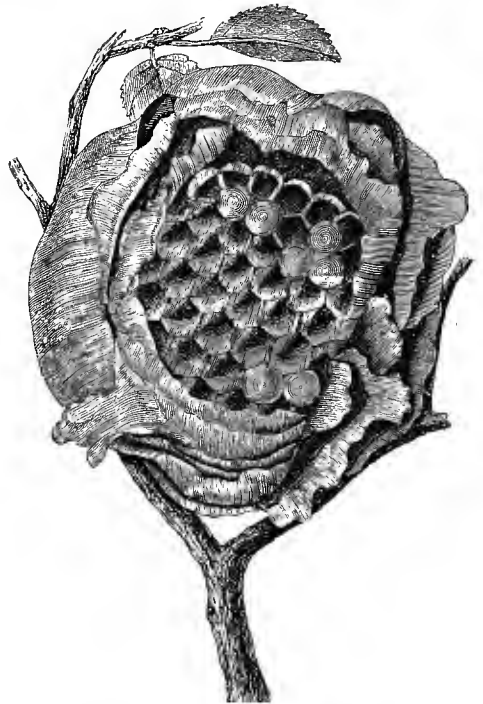


FIG. 214. NEST OF TREE WASP.

—e.g., a bottle containing a little sweet fluid of any sort suspended in a tree. A good trap is easily prepared by placing a bell glass on three supports, so as to leave space for insects to fly or crawl in below to the bait (sugar, treacle, or other sweet stuff), placed in a plate under the bell glass. The latter should open at the top by a hole, and above it should be placed another glass, closed at the top. The insects, on rising from the bait, fly upwards, pass through the hole in the lower glass, and are trapped in the space between it and the upper one. The glass "fly-catchers," now coming into use, effect the capture of Wasps in a similar way, and deserve a trial by any one troubled with an abundance of the insects. The situations of the nests determine the most likely methods

**Wasps—continued.**

to insure their destruction. The Wasps do not work at night, hence that time should be chosen for operations against them. Nests in holes may be destroyed by means of squibs of maled gunpowder and sulphur. One of these should be pushed through a piece of turf about a foot square, and two or three inches thick; the squib should be lighted, and put into the Wasps' burrow, and the turf closely pressed down to keep in the smoke. Wet mud plastered round the turf helps in this object; and some of the mud should be placed over the hole when the squib is driven out by the final explosion. A more difficult method is to flood the nest with hot water. 'Tree Wasps' nests can best be destroyed by placing a pail of water underneath at night, and cutting the support of the nest, so as to allow the nest and its occupants to fall into the water. The pail should have a lid, in case any of the Wasps should climb out of the water. Such nests may also be smoked with sulphur, but with less certain results.

In the article on the **Honey Bee** (*Apis mellifica*), the promise was made that the habits of that insect should be treated of in connection with those of Wasps, with which the former insect agrees in many particulars. Some of the leading features of agreement and of difference between them are, therefore, here briefly indicated.

Like the social Wasps, the honey bees live in large societies, including workers (or neuters), females (or queens), and males (or drones), and form their nests in holes when in the wild state. Bees in domestication live in hives; but not infrequently a swarm, on leaving the parent hive, will select a hole for themselves, from which it is often very difficult to dislodge them. But though Bees agree with Wasps in these respects, they differ from them in many important particulars, and to these points of difference attention must now be given.

Bees form new nests in a different way from Wasps. The females, or queen bees, do not themselves work at the nests; nor do they rear the young grubs or feed them, as is done by the female Wasps in spring. The only duty of the queen bees is to lay eggs, which are at once taken care of by the workers; and the latter alone nurse the grubs, and look after the pupæ. The queens leave the nests to pair; and after they have paired they return very soon, and never again leave the hives, except in swarming, when one queen goes with each new colony. At all other times they remain inside, surrounded by a multitude of workers, which feed their queen, and follow her as she deposits her eggs in the cells prepared for them. Each new nest of honey bees is thus not the work of a single female, but is formed by a colony or swarm from some older nest, the bees in which have become too numerous to remain at home with advantage to the commonwealth. Each swarm consists of a queen and a number of workers.

Among Wasps there is, comparatively, little difference between workers, females, or males; but among honey

**Wasps—continued.**

of the head; while in the females and neuters the eyes are entirely lateral. The males, or drones, take no part in the work of the hive. They are produced from eggs laid usually in April or May, and assume their perfect condition in summer. They fly during the warmest part of the day, and pair with the newly-emerged queens during flight. If the impregnation of a queen is retarded till twenty-eight days after hatching, she lays only male eggs. In hives where the queen is laying eggs from which workers can be reared (i.e., if impregnation has not been long delayed after she reached maturity), it has been observed that the workers, towards the beginning of autumn, attack the drones, and kill them by stinging them. Where the queen is capable of laying only male eggs, and also when the queen has died, or has been removed from the hive, the males are not killed till a fertile queen has been secured. There is only one queen bee in each hive; but if she is lost, the workers proceed to rear others from worker-larvæ, by enlarging their cells and supplying them with abundance of food. This treatment causes the earlier stages to be passed through in a shorter time, and also produces a marked result in modifying the bodily structure—the bees produced being true females, with all the physical peculiarities that distinguish the latter from the workers. When it is necessary to replace a queen, there are usually from twelve to twenty larvæ reared for the purpose. As soon as the first queen that reaches maturity is able, she goes round the cells containing the others, still in the state of pupæ, and gnaws a hole in each cell. If the cell contains a queen ready to emerge, the latter is stung by her older rival. The workers pull the pupæ or dead bodies of the queens from the cells, and remove them. Should two queens emerge at the same time, it has been observed that one kills the other. So, also, when a stranger queen is introduced into a nest, she and the rightful queen fight till one is killed.

At the periods of swarming, the workers prevent the slaughter of as many young queens as are required for the nest and the swarms. The old queen leads off the first swarm; and the young females that are to go with new swarms are not permitted to emerge from their cells till the swarms are ready to depart. Thus fatal contests are prevented among them.

The workers differ from the queens as follows: They are smaller; the jaws, or mandibles, are more prominent; the maxillæ and tongue are longer, and the upper lip and antennæ are black (in the queens the upper lip is fulvous, and the antennæ are pitchy-brown); the legs are black, with the tarsi brownish; the basal joints of the tarsi, and the tibia of the hinder legs, are broader, and hollowed externally, and bear stiff hairs on the sides and across them, so placed as to form a receptacle in which to carry the pollen, or "bee-bread," collected from flowers for the nourishment of the bees and of the larvæ; the abdomen is broader and less pointed, and the three middle segments bear a small wax-pocket on each side near the base. These differences are very considerable; yet the facts that the larvæ of workers can be made by special treatment to produce queens, and that the workers possess (functionless) representatives of ovaries, show that they are indeed females in which the reproductive organs have remained undeveloped, and which are fitted to perform special duties for the good of the community. The workers do all the work of the hive: they build the cells, collect the honey, pollen, and a resinous substance known as "propolis," and feed and attend to the young. These operations are so varied that they are divided between two classes of workers, of which one prepares the wax, and the other attends more especially to building it into cells, collecting the food, and rearing the young.

The makers of wax eat some sugar or honey; and a number of them cling together, in a cluster of festoons,



FIG. 215. HONEY BEES.

bees the differences are evident. Fig. 215 shows that they differ in size and form of body; and also that the eyes of the males are so large as to meet on the top

**Wasps—continued.**

for about twenty-four hours, without active movement. During this time, the wax is formed in thin plates, one in each of the little pockets mentioned above as occurring on the three middle segments of the abdomen. When the wax is formed, the bee detaches the plates from the pockets, and chews them up, mixed with a liquid from the mouth, into a riband, which is deposited on the place where it is to be made into cells. After the wax-makers have deposited the materials, the other class of workers build it up into the cell walls, making the cells larger or smaller, as required for the females, males, and workers. The edges of the cells are finished with a kind of adhesive varnish, which melts less easily than wax, and is redder in colour. This is the "propolis," which the bees collect from the bud-scales of Horse Chestnuts, Poplars, and other trees possessed of sticky buds. Attention has frequently been called by zoologists and mathematicians to the regularity of form and of size in the cells, and also to the fact that their form secures the greatest possible inclosed space with the smallest possible expenditure of wax.

Many of the cells are occupied by larvæ or pupæ; but others are employed as storerooms for the honey, and often the cells from which young bees have emerged are cleared out and filled with honey. The visits made by bees to flowers, in the course of which they are of so great use in effecting pollination in many plants, have as their object the collection of nectar and of pollen. (see **Nectar, Nectary, Orchid Fertilisation, and Pollination**). The bees swallow the nectar, and continue their visits to flowers till the stomach, or honey-bag, is filled with the sweet fluid. They then collect the pollen, forming little masses of the grains brushed off their bodies; they place them upon the hairy, flattened portions of the hind legs, and they thus form a load of food to be carried back to the hive. In the stomach the nectar undergoes a change by which it is converted into honey, and this is either given at once by the collectors to those bees that have been at work in the hive, as food, or is poured into the cells. Those which contain honey that is soon to be used are not closed; but such as are reserved for food during winter are covered with wax. The pollen is either eaten by the bees themselves, or is given to those that have been at work in the nest, or to the larvæ, or it is stored away in cells for future use. On these stores the bees subsist during winter; hence the nests are not broken up on the approach of cold weather: nor do the bees resemble Wasps in destroying their larvæ in autumn, as they can provide them with food. When the honey is taken from hive bees, it is necessary to supply them with sugar and water, or with other sugary substances, from which they can prepare honey.

It may be mentioned, in conclusion, that there are several kinds of bees in domestication, of which *A. mellifica* is the commonest, and has been specially kept in view above; the other species differ only from it in minor details.

**WATER.** Water is so indispensable to the very existence of plants, that its use and modes of action deserve to be more fully understood than they are by many gardeners. It is made up of a combination of two gases, Oxygen and Hydrogen, in the proportion of sixteen (by weight) of the former to two of the latter. By volume, the proportion is one of Oxygen to two of Hydrogen, the chemical formula being  $H_2O$ . The properties of Water are, for the most part, so well known as to render it needless to dwell upon them. When pure, it has neither colour, taste, nor smell; nor does it leave any solid matter when it is allowed to evaporate by heat or by exposure to the atmosphere. That Water is converted into ice, and rain into snow, at a low temperature (32deg. Fahr.), is a fact familiar to everyone in such a climate as ours. While it is freezing, the

**Water—continued.**

Water frees itself from by far the greater part of mineral substances that may be dissolved in it; so that ice consists of almost pure Water, even when formed from the salt Water of the sea. Pure Water has the power of dissolving many mineral substances and gases in greater or less amount, the greatest quantity of any particular substance or gas that it can dissolve varying with its temperature. The solutions thus formed are of very great importance in horticulture, since it is in this form that plants absorb the elements found in their ash, and which are mostly essential to their support. These solutions of minerals in the soil are almost always extremely dilute. In such weak solutions minerals can be absorbed with much greater readiness by the root-hairs of plants than they could be were the solutions stronger, so that they are well suited to supply the requirements of plants. Some minerals—e.g., Carbonates of Lime (whether in the form of marble or of chalk)—are scarcely, if at all, soluble in pure Water; but they become dissolved in water which has Carbonic Acid Gas already dissolved in it. Probably, no natural Waters are wholly deficient in this gas, and they can dissolve small quantities of even marble or Phosphates of Lime. The roots of plants can themselves also dissolve these minerals when in close contact with them. In all cases, the minerals necessary for the nutrition of the plants pass into them from the soil in these weak solutions. There is a constant passage of the fluids into the roots, and thence into the leaves, in order to replace the Water that is at all times escaping from all the green parts into the air in the form of invisible vapour.

The amount and nature of the water-supply for a garden is a matter of very great consequence; and it is necessary to inquire a little into the various natural sources from which it can be obtained, and the relative merits of the Water from each. The sources may be grouped under (1) rain, (2) ponds and streams, and (3) springs. Though it is impossible to draw sharply-defined distinctions between the Waters from these sources, yet they differ in several respects.

Rain is, in a sense, the source from which all Waters are derived, and from which all streams are fed; but the term Rain-water, in the ordinary sense, is restricted to that collected from the atmosphere—usually off the roofs of houses—and carried into a tank, in which it is stored till required. Pure Rain-water may contain a small quantity of Nitrates and Ammonia, which it dissolves out of the atmosphere, and carries with it to the earth. But, owing to the dust and impurities on the roofs or other surfaces from which it is usually collected, it always has also an appreciable, though very small, amount of various mineral substances dissolved in it; and is thus able to supply to plants at least a part of the mineral food that they require. It is fitted also to dissolve from the soil in which plants grow such substances as Carbonate of Lime, as it almost always contains a good deal of Carbonic Acid Gas, and also some Oxygen, dissolved while falling through the atmosphere. It is heated to the same average temperature as the air, so that in summer it helps to warm the soil to that temperature; and it thus stimulates the growth and power of absorption of the roots, and fits them to supply Water to the plants as quickly as it evaporates from the leaves. Rain-water is preferred for watering plants on account of its temperature being nearly the same as the air, and of the gases dissolved in it.

The Water in streams and in ponds contains a larger proportion of mineral substances than occurs in pure Rain-water, the gases are often present, only in smaller amount, and the average temperature—except in very shallow streams and ponds—is usually lower than that of the air in summer; and this is especially the case with Water conveyed from a distance in underground pipes.

Spring Water resembles that from streams in the amount

**Water—continued.**

of mineral substances in it; or it may even contain these substances in such amount that some of them, especially Carbonate of Lime, may be deposited in a crust on any bodies in the water, owing to evaporation of Carbonic Acid Gas from it, rendering it no longer able to keep them dissolved. Petrifying springs are of this nature. Some springs give Water that is actually injurious, as it contains compounds of Iron, or other substances that are poisonous to plants if present in more than very small amount. The Water from ordinary springs is almost always a good deal colder than the air in summer. If Water from streams, ponds, or springs is to be used in watering plants, it should be kept for some time previously in a tank small enough to allow of its being warmed to the ordinary temperature of the air in summer.

The amount of Water usually present in any soil has a very important influence on its fertility. Light soils with open, sandy subsoil are apt to suffer from want of Water; and a moderate drought may prove very prejudicial, or even fatal, to the plants cultivated in such. On the other hand, clays (and, in a less degree, other soils), over a close, impervious subsoil, retain Water too strongly, so that it stagnates; or they may allow the rain to run off the surface, and, if shallow, may actually suffer from want of Water during continued droughts, after the supply in the surface soil has evaporated. Light soils are much benefited by careful irrigation. Stiff soils, on the contrary, are usually in need of well-considered drainage. The latter operation is of wider utility than is recognised by many agriculturists. That it removes superfluous Water is obvious, and it is admitted by all that stagnant Water in the soil is hurtful to most plants, and in more ways than one. It promotes the formation, from decaying organic remains in the soil, of substances prejudicial to many plants; and where such substances are abundant, only certain weeds will grow. Waterlogged soils are deficient in the Oxygen that is required by roots to permit of the healthy discharge of their functions; the roots are unable to exist under the conditions present a few inches below the surface, or to penetrate deeply; the plants therefore are ill-nourished, as the roots spread less than in more open soils, and they derive their mineral food only from a limited area below the surface. In case of severe drought, the Water may all evaporate down to the depth reached by the roots, while the stiff subsoil prevents the passage of Water from below to take its place; and the plants cultivated on waterlogged land may thus die for lack of Water. Moreover, waterlogged soil is always considerably colder than the average temperature of the air, owing to the heat lost by the constant evaporation of Water from its surface. The crops cultivated on it are thus rendered backward in their growth, and may not reach maturity till a week, or even a fortnight, after those on well-drained soils. All this is changed when drains are well placed and well made, and the impervious subsoil is broken up. The rain no longer runs off the surface, nor does Water stagnate in the soil: it sinks into the subsoil, and there forms a reserve from which the surface soil can obtain supplies as required by the plants in it. The rain, while falling, becomes heated to the temperature of the air, or nearly so, and is thus able to warm the soil in sinking through it, and to supply the roots with Water at nearly the same temperature as the air—a condition most favourable to the due performance of the vital functions, and rapid and healthy growth in plants. Free evaporation from the soil is checked; and, this cause of coldness being removed, the crops are found to ripen earlier. As the rain sinks into the soil, the air follows into the interspaces vacated by the Water: thus the roots are supplied with the gases they require, and, as a result of this, and of the absence of the injurious organic substances formed in

**Water—continued.**

stagnant Water, they penetrate deep into the subsoils, beyond the reach of ordinary droughts. In this way they, at the same time, obtain a more reliable source of Water, and draw their food from a wider area.

The means by which Water enters plants, to form the crude sap, the changes that this undergoes, and the channels by which it is conveyed through the tissues, are treated of elsewhere in this work. See **Sap, Vascular System, and Vessels.**

**WATER ALOE.** A common name for **Stratiotes aloides** (which see).

**WATER ANEMONE.** A common name for **Ranunculus aquatilis** (which see).

**WATER ARCHER.** A common name for **Sagittaria sagittifolia** (which see).

**WATER ASH, CAROLINA.** See **Fraxinus platycarpa.**

**WATER AVENS.** See **Geum rivale.**

**WATER BALSAM.** See **Tytonia natans.**

**WATER BEAN.** See **Nelumbium.**

**WATER BETONY.** See **Scrophularia aquatica.**

**WATER CALTROPS.** See **Trapa natans.**

**WATER CRESS.** See **Cress, Water.**

**WATER ELDER.** See **Viburnum Opulus.**

**WATERFALL.** See **Cascade.**

**WATER FLAG.** See **Iris Pseudo-acorus.**

**WATER GLADIOL.** A common name for **Butomus umbellatus** (which see).

**WATERING.** One of the most important operations in connection with the cultivation of plants, particularly those which are grown in pots and planted out in glass structures. It is an operation in daily practice at all seasons, and one which often requires the exercise of much judgment and care on the part of the operator. There are numerous subjects that may easily be injured, or even killed, by receiving either too much water, or an insufficient supply, and there are very few plants which do not suffer more or less by being watered indiscriminately at fixed periods, as their condition must vary according to the amount of evaporation which is taking place, and the quantity of roots that are absorbing the moisture supplied. It is not possible to do more than refer to Watering in somewhat general terms, as individual plants have often to receive special attention in regard to it, and different species in a genus also sometimes require totally different treatment in the matter of watering. As a rule, soft-wooded plants, and all those of quick growth, require more water than others of a slow-growing or hard-wooded nature; but exceptions may not unfrequently be found. Seasons of growth and of rest have also to be dealt with, and the supply of water given accordingly. Soft rain-water is always the best for plants of every description; provision should, therefore, be made for collecting and preserving as much as possible for future use from the roofs of glass and other structures. Water should not be applied to plants at a lower temperature than that to which they are at the time subjected; particularly does this remark apply to such as are grown in heat, or are being subjected to forcing under glass. Even upon plants established in the open ground, cold water has an injurious effect during summer time if applied direct from springs or wells; it becomes efficiently warmed in large, open tanks, streams, &c., exposed to the sun and air, hence one of these sources is most desirable.

Plants in pots, when they require Watering, should be well soaked, not slightly damped; it may not, in every

**Watering—continued.**

instance, be necessary to keep Watering daily, but surface sprinklings are always to be avoided. The amount of water and the frequency of its application are matters which can only be known from personal experience in dealing with various subjects under cultivation: some require it, in summer, two or three times a day, while others would be ruined were they similarly treated. The times when water is likely to be needed should be anticipated somewhat, so as to avoid having to give it more than is really necessary during sunshine in the middle part of a hot day. In summer, Watering should be proceeded with early in the morning if it is known that the plants will require a supply before the afternoon, the general Watering being given when it is nearly time to reduce the air for the day. Should it become necessary to water in the day-time, a supply should be procured of a temperature equally warm to that in which the plants are growing. Occasionally, a specimen will get overlooked, and will show signs of flagging; it should then be stood in a pail of water until well soaked, and kept shaded for the remainder of the day. In winter, it is generally very desirable to have the foliage of most plants dry at night. Watering is, therefore, best done in the morning only; not that it is always necessary to wet the foliage, but because of the moisture that must be caused by waste on the stages, &c.

The necessity for Watering trees, shrubs, &c., outside, of course depends on the seasons and other circumstances, such as recent transplanting, &c. Whenever the operation becomes necessary, it is always best to give copious supplies, and then to mulch the surface with some dry, light material, as this tends to prevent undue evaporation. This method of management is also applicable in summer to fruit-trees, and, indeed, crops of any kind, indoors or out, that are planted in the ground, and require plentiful supplies of water at the roots.

**WATERING-POTS.** These, in various sizes, are requisite where there are many kinds of plants to be kept watered. For trees of all kinds, shrubs, outside garden crops, &c., the ordinary kind, with coarse rose, is well adapted, but the use of the rose is not always necessary. A pot holding from twelve to sixteen quarts is quite large enough for carrying and managing when full; the latter capacity being an extreme limit. Pots of smaller sizes are necessary for watering indoor plants, and these are better managed when the spouts are made longer in proportion than in the larger sizes. Sizes each holding two, three, four, five, and six quarts of water are adapted for use with long spouts; these prove most serviceable where plants have to be reached at a considerable distance from the person who is watering. It is sometimes an advantage to have the end of the spout bent downwards, at about a right angle, where the rose is fixed, as the water runs without lifting the can up so high. For watering beds, pots, or pans, where small seeds have been sown, a very fine rose is necessary, and it should fit the spout so that all drip is prevented: this is best insured by having the rose made of brass, so that it can be readily screwed on or taken off as desired. If the same thread is used, several roses, perforated to various degrees of fineness to suit the plants or seeds that are watered, can be employed for screwing on a can. Watering-pots specially intended for Strawberries in spring are not furnished with a cross handle over the top; they hold about two quarts of water, and are provided with long spouts for the purpose of watering the plants referred to, when situated rather closely together, and on shelves near the glass. Watering-pots are usually either jannaped, painted red or green, or galvanised in a similar way to ordinary cisterns. If the whole surface is properly galvanised inside and out, there is no danger of rusting, and Watering-pots made of galvanised iron are very strong and durable.

**WATER LEMON.** See *Passiflora laurifolia*.

**WATER LENTILS.** A common name for *Lemna* (which see).

**WATER LETTUCE.** See *Pistia Stratiotes*.

**WATER LILY.** A common name for various species of *Euryale*, *Nuphar*, *Nymphaea*, *Victoria*, and *Villarsia*.

**WATER MELON.** See *Citrullus vulgaris*.

**WATER MILFOIL.** See *Myriophyllum*.

**WATER OAK.** See *Quercus aquatica*.

**WATER PARSNIP.** See *Sium*.

**WATER PLANTS.** A general term applied to all plants which grow in water, both in and outdoors. Perhaps the most familiar of all are Nuphars and Nymphaeas. With these the following, amongst many others, may be associated, but some require a greater depth of water than others: *Acorus Calamus*, *Alisma Plantago*, *Aponogeton distachyon*, *Butomus umbellatus*, *Calla palustris*, *Hottonia palustris*, *Limnanthemum nymphaeoides*, *Pontederia cordata*, *Sagittarias*, *Stratiotes aloides*, *Trapa natans*, *Typha angustifolia* and *T. latifolia*, and *Vallisneria spiralis* (indoors).

**WATER SOLDIER.** See *Stratiotes aloides*.

**WATER SPIKE.** An old name for *Potamogeton*.

**WATER THYME.** See *Elodea*.

**WATER VIOLET.** See *Hottonia palustris*.

**WATER WHITE OAK.** See *Quercus lyrata*.

**WATSONIA** (named after W. Watson, 1715-1787, Professor of Botany at Chelsea). Bugle Lily. *SYNS. Meriana, Neuberia*. *ORD. Iridæ*. A genus comprising according to Klatt twenty-five, according to Baker eleven, species of greenhouse, bulbous plants, confined to South Africa. Flowers one to a spathe, sessile; perianth tube curved or recurved, the lobes sub-equal, ovate, oblong, or lanceolate; stamens affixed within the throat; filaments free, filiform, rather long; spathes lanceolate, oblong, or narrow, often numerous, scattered or somewhat imbricated; spikes long, simple or slightly branched. Leaves long, ensiform, rather rigid, veined, the midrib usually prominent. Stem frequently tall. Watsonias are very pretty subjects when in flower. They require a mixture of very sandy loam and a little peat. If planted out in a pit or frame, where protection from frost can be ensured, they will flower much stronger than if kept in pots. Little or no water should be given during the resting season. Propagation may be effected by offsets, or by seeds.

**W. aletroides** (Aletis-like). *fl.* seven to twelve crowded in a spike, drooping; perianth scarlet, the tube lin. long, the segments acute,  $\frac{1}{2}$  in. long; spathes ten lines long; scape terete, simple, leafy, 1 ft. to 2 ft. high. *June*. *l.* linear-ensiform, thick, acute, shorter than the scape,  $\frac{1}{2}$  in. broad, margined and ribbed with yellow. 1774. (*B. M.* 553.) *SYN. Antholyza Merianella* (*B. M.* 441).

**W. angusta** (narrow). *fl.* eight to twenty-four, densely imbricate-spicate, distichous; perianth brilliant scarlet,  $\frac{1}{2}$  in. long, the segments oval-oblong, much spreading; spathes purple, scarious, seven lines long; scape simple or branched, erect, terete, spathiform-leafy. *June*. *l.* distichous, lanceolate-ensiform, acute, lin. broad, much striated. 1825. *SYNS. W. iridifolia fulgens* (*B. M.* 600; *F. d. S.* 1077), *Antholyza fulgens* (*A. B. R.* 192).

**W. brevifolia** (short-leaved). *fl.* eight to fifteen, imbricate-spicate, distichous or secund; perianth scarlet, lin. long, the tube twisted, curved, the segments regularly spreading, mucronate; spathes unequal-valved, the inner valves bifid at apex; scape erect, simple,  $\frac{9}{16}$  in. to 15 in. high. *May*. *l.* cauline ones spathe-like; radical ones broadly or narrowly linear-ensiform, distichous, cuspidate, ribbed and margined, two to seven lines broad. 1794. (*B. M.* 601.) *SYN. Antholyza spicata* (*A. B. R.* 56).

**W. densiflora** (dense-flowered).\* *fl.* in a dense, distichous spike; perianth rose-red, the tube  $\frac{1}{2}$  in. long, the spreading, lanceolate, acute segments  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long; scape as long as the leaves, covered with numerous reduced leaves. *June*. *l.* erect, linear,

**Watsonia**—continued.

rigid, 1½ ft. to 2 ft. long, ½ in. broad, with several strong ribs, and a thickened, straw-coloured margin. 1879. A fine, well-marked species. (B. M. 6400.)

**W. humilis** (dwarf). *fl.* five in a distichous spike; perianth rose-coloured, 2 in. long, the segments regular, oblong-ovate, acute; spathe equal-valved, equalling the perianth tube; scape simple, terete-angled, 8 in. to 12 in. high. June. *l.* lanceolate-ensiform, straight, acute, ribbed and margined, distichous, shorter than the scape, one to two lines broad. 1754. (B. M. 631.)

**W. iridifolia fulgens** (Iris-leaved, brilliant). A synonym of *W. angusta*.

**W. marginata** (conspicuous-margined). *fl.* ten, slightly imbricated, distichous, nodding; perianth pink, 1½ in. long, the segments obovate-elliptic, mucronate; spathe nearly equal-valved, ½ in. long; spikes several; scape terete, simple, nearly 2 ft. high. July. *l.* lanceolate-ensiform, slightly coriaceous, thickly ribbed and margined, cuspidate, shorter than the scape, ½ in. broad, glaucescent. (B. M. 606.)

**W. m. minor** (lesser). *fl.* of a beautiful pink; spike solitary. *l.* rather dark green, lucid, obscurely cartilaginous on the margins. (B. M. 1530.)

**W. Meriana** (Madam Merian's). *fl.* three to nine, distichous; perianth purple or scarlet, somewhat salver-shaped, the throat acuminate-cylindrical, 1 in. long, the segments obovate-oblong, acuminate, 1½ in. long; outer spathe valves purple, striated, 1½ in. long, the inner ones bifid, 1½ in. long; scape terete-angled, striated, simple or branched, 9 in. to 2 ft. high. May. *l.* lanceolate-ensiform, thick, much striated, margined, acute, two to six lines broad. 1750. SYN. *Antholyza Meriana* (B. M. 418).

**W. M. coccinea** (scarlet). *fl.* five to eight; perianth scarlet, 2½ in. long; scape 1 ft. to 2 ft. or more high. A splendid variety. (B. M. 1194.)

**W. M. iridifolia** (Iris-leaved). *fl.*, perianth white, funnel-shaped, eleven lines long; scape 3 ft. high. *l.* broadly lanceolate-ensiform, acute, shorter than the scape, 1½ in. broad.

**W. M. roseo-alba** (pink and white). *fl.* twenty-four, densely imbricate-epilate; perianth pink and white, 2½ in. long; scape 2 ft. to 3 ft. high. *l.* broadly linear-ensiform, 1½ in. wide, shorter than the scape. (B. M. 637 and 1193, under names of *W. roseo-alba* and var.)

**W. punctata** (dotted). *fl.*, perianth scarlet or violet, funnel-shaped, 1½ in. long, the tube erect, filiform, the segments ovate-lanceolate, lined; outer spathe valves ferruginous, ½ in. broad, the inner ones bifid, ½ in. broad; scape terete, erect, 4 in. to 15 in. high. June. *l.* three, linear-compressed or terete, slightly furrowed, sheathing at base. 1800. SYN. *Ixia punctata* (A. B. R. 177)

**W. rosea** (rose-coloured). *fl.* crowded in a paniculate, elongated-pyramidal spike; perianth rose-coloured, sub-campanulate, nearly 2 in. long, the throat broadly truncate, the segments mucronate; spathe purple, five lines long; scape terete, simple or branched, nearly 2 ft. high. July. *l.* broadly lanceolate-ensiform, 1 in. broad, cartilaginous-margined, striated, acute. 1803. (B. M. 1072.) SYN. *Gladiolus pyramidalis* (A. B. R. 335).

**W. strictiflora** (straight-flowered). *fl.* scentless; perianth cherry-red, about 3 in. long, the tube quite straight, the opening of the throat marked with a violet-purple star of six rays; scape taller than the leaves, simple. June. *l.* linear-ensiform, rather rigid, 4 in. to 6 in. long, about ½ in. broad. Bulb the size of a large nutmeg. 1810. (B. M. 1406.)

**WATTLE.** A name applied to various species of *Acacia* and *Citharexylum*.

**WAX DAMMAR.** A common name for *Podocarpus neriifolia* (which see).

**WAX FLOWER.** See *Hoya*.

**WAX FLOWER, CLUSTERED.** See *Stephanotis floribunda*.

**WAX, GRAFTING.** See *Grafting Wax*.

**WAX MYRTLE.** A common name for *Myrica cerifera* (which see).

**WAX PALM** (of Brazil). See *Copernicia cerifera*.

**WAX-PLANT.** A common name for *Cerinth major* (which see).

**WAX-TREE.** A common name for *Vismia guianensis* (which see).

**WAY BREAD.** An old name for *Plantago*.

**WAYFARING-TREE.** See *Viburnum Lantana*.

**WEASEL** (*Mustela vulgaris*). Many persons regard Weasels as noxious animals that should be killed on every possible opportunity; but they are most valuable in gardens by destroying all kinds of mice. The latter are often very hurtful, as they eat peas and other seeds, and gnaw the bark or the roots of choice trees and shrubs. Hence Weasels deserve protection in gardens, although it cannot be denied that they are occasionally destructive where fowls are kept.

**WEATHER.** The relation of the Weather to gardening, and its effect upon garden crops, are matters often too well known, especially when the results are unsatisfactory. Still, it is important for gardeners to be continually studying the subject, with a view to adapting themselves to circumstances by taking advantage of every help which the Weather affords, and at the same time using precautions, so far as possible, for preventing it from doing injury. Those who would manage gardens successfully must always be looking ahead, and anticipating what is likely to come later on, as well as directing their attention to making provision for the present. Thus, what is likely to occur during the day needs consideration in the morning, and provision for the night must invariably be made the previous evening. The Weather affects outside vegetation and crops according to locality and the nature of soil and subsoil. Where the latter is gravelly, the effects of drought are most readily felt, while a clayey subsoil has naturally a tendency to hold more moisture, and is, consequently, not favoured by very wet seasons. In regard to the important work of transplanting of any kind, the state of the Weather must be the first consideration, coupled with the proper season for performing the work. Very dry Weather is always unfavourable for any transplanting. Watering may be ever so well attended to, yet if there is a constant and rapid evaporation taking place its effects are not much marked. Mild, moist Weather should therefore be selected for this work; it must even be waited for a long time in some seasons before crops can be transplanted and safely re-established. Due advantage should be taken of frosty Weather, when the ground is hard, for executing such work as wheeling manure, &c., into places that cannot be well reached when walks and the ground are loose. In snowy Weather, when outside work has often to be suspended, everything that can be forwarded in sheds should receive full attention. Digging should not be proceeded with while the ground is frosty, neither should snow be buried by the same operation. In garden management, the work must, to a certain extent, be arranged each day according as the Weather allows; the seasons too, which are very variable, will need to be studied, and work managed according as circumstances depending on these, and the changes of Weather, will admit. In the management of glass structures and pot plants generally, attention to the changeableness of the weather is of much more importance than to plants, &c., outside. A properly-constructed glasshouse will quickly be affected by a rise or fall of temperature caused by the Weather outside; and as the inside occupants are frequently very tender, and incapable of bearing with impunity what harder subjects outside can withstand, the conditions necessary for their well-being have to receive constant and daily attention. The chief point to be impressed is that of adopting a system of management which shall utilise every opportunity of forwarding operations, so far as may be practicable, be the climatic conditions whatever they may. To do everything at the proper time, is equally important in this as in all other matters. In gardening, it can only be effected by a considerable amount of forethought on the part of those in charge, coupled with practical experience, to know what cultivated plants require, and by daily attention, which has to be constantly varied to meet exigencies caused by an ever-changing climate.



**WEBBIA.** Included under **Vernonia** (which see).

**WEBERA** (named in honour of George Henry Weber, 1752-1828, Professor at Kiel, and author of various Floras). **SYNS:** *Ceriscus*, *Chomelia* (of Linnæus), *Stylocoryne* (of Wight and Arnott), *Tarenna*, *Wahlenbergia* (of Blume). **ORD.** *Rubiaceæ*. A genus comprising about forty species of stove trees and shrubs, inhabiting tropical Asia, Polynesia, Africa, and (one species) Australia. Flowers in terminal, corymbiform cymes, sessile and bibracteolate at the ovary, or pedicellate and bracteolate on the pedicel; calyx tube ovoid or turbinate, the limb five, rarely four, cleft or parted; corolla funnel- or salver-shaped, with five, rarely four, narrow, spreading or reflexed lobes, twisted in bud; stamens five, rarely four, on the mouth of the corolla; filaments short or wanting. Leaves opposite, petiolate, often oblong-lanceolate; stipules triangular-ovate, usually deciduous. Only one species calls for description here. For culture, see **Vangueria**.

**W. corymbosa** (corymbose). *f.* white, faintly odorous; corolla  $\frac{1}{2}$  in. in diameter, the tube broad, about equalling the lobes; cymes variable in size. Summer. *l.* elliptic- or oblong-lanceolate, acute or acuminate,  $\frac{3}{4}$  in. to  $\frac{1}{2}$  in. long, shining above, often glaucous beneath; petioles short, stout. India. A glabrous shrub or small tree. (B. R. 119.)

**WEB-FORMING CATERPILLARS.** Almost all the Caterpillars of Butterflies, Moths, and Sawflies can spin silken threads when required; but many of them hardly do so except to form a cocoon, for the protection of the pupæ; while many do not even spin a cocoon. Many larvæ spin together several leaves to form a protection for themselves against birds or other foes, or they draw a leaf into a tubular form, with the same object, keeping it in position by silken threads. The Web-formers are not very numerous, though they belong to widely different groups of *Lepidoptera*. Several of them live on Hawthorn leaves, such as the Black-veined White Butterfly (*Aporia Cratægi*), the small Ermine Moths (*Hyponomeuta padella*, &c.), and Sawflies of the genus *Lyda* (e.g., *L. punctata*). The larvæ of these insects, when young (or during their whole life as larvæ), live in webs spun by a number of them in common, sometimes over a whole branch, but usually over several leaves. Some form separate silken tubes for themselves inside the webs; others are contented with the protection afforded by the web alone. An account of the several insects just mentioned is given under the heading **Hawthorn Caterpillars**.

The larvæ of various European and exotic Moths form much more striking and conspicuous webs than do the British species—e.g., the Processionary Moth (*Cnethocampa processionea*), which feeds on Oaks in Germany. The larvæ spin a web, on which they lie, and, when going to feed, they march in a regular procession—first one, then two, then three, and so on, those in each line moving side by side, till they reach suitable food, when they disperse and eat what they require, and thereafter return to the web in the same regular order. When full-fed, they spin a compact web, under cover of which they form their separate cocoons to protect themselves while they are pupæ.

**Remedies.** Web-forming Caterpillars are easily got rid of by tearing down the webs, or cutting off the branches, and destroying the larvæ.

**WEDELIA** (named in compliment to George Wolfgang Wedel, 1645-1721, a German botanist, Professor at Jena). Including *Wollastonia*. **ORD.** *Compositæ*. A genus embracing about forty-five species of stove, greenhouse, or hardy, scabrous-pubescent or hirsute, annual or perennial herbs or sub-shrubs, inhabiting the warmer parts of the globe. Flower-heads yellow, pedunculate, at the tips of the branches or in the upper axils, heterogamous; involuclral bracts sub-biseriate, the outer three to five usually herbaceous or leafy, the inner dry; receptacle flat or convex, the pales inclosing the florets; ray florets ligulate,

**Wedelia**—continued.

entire, or two or three-toothed at apex; disk florets five-toothed or shortly five-cleft; achenes smooth or tubercled. Leaves opposite, often toothed, rarely trifid or entire. The species are mostly interesting from a botanical standpoint only. Those described below thrive in any fairly good soil. *W. hispida* may be increased by seeds or by divisions, and *W. radiosa* by seeds or by cuttings.

**W. aurea** (golden). A synonym of *Zexmenia aurea*.

**W. hispida** (hispid). *f.* heads one to a peduncle; outer involuclral scales hairy, the inner ones nearly glabrous. June. *l.* lanceolate or somewhat obovate-lanceolate, cuneate at base, acuminate at apex, cut-toothed, hairy. Branches erect, hispid. *h.* 1½ ft. Mexico, &c., 1819. Half-hardy perennial. (B. R. 543.) **SYN.** *Zexmenia texana*.

**W. radiosa** (rayed). *f.* heads one to three on peduncles longer than the leaves; involuclral scales in three series, the outer ones leafy, the inner membranous. June. *l.* petiolate, ovate- or oblong-lanceolate, acute, serrulated, puberulous. *h.* 2 ft. Brazil, 1820. Greenhouse sub-shrub. (B. R. 610.)

**WEDGE-GRAFTING.** See **Grafting**.

**WEEDS AND WEEDING.** Weeds abound in every direction on cultivated land, and wherever there is any kind of soil in which their roots can receive the least encouragement and support. It is sometimes remarked in reference to a piece of land that "Weeds won't grow on it," and this is readily understood as referring to its uselessness for gardening. The length of time during which the seeds of many common Weeds retain their germinative powers is remarkable when, from the removal of ground, or other causes, they become buried too deep to grow until brought again under the more immediate influence of the atmosphere. The rapidity with which soil newly upturned after a long period becomes covered with Weeds will often come under notice, suggesting the existence of seeds which grow only when placed under suitable conditions. Amongst Weeds that, once established, are only with great difficulty eradicated, are Chickweed, Couch Grass, Dandelions, Groundsel, Plantains, and Thistles. The destruction of all these before their seeds ripen, and the frequent use of the hoe during dry weather, are the best plans of preventing their increase. Hand-weeding is the most effectual mode of eradication where there are tap-roots, as in Dandelions, Plantains, and Thistles. The roots of these plants, if left in the ground, will frequently form new crowns in a short time, and grow again. Hand-weeding is also the most certain plan of keeping walks clean; it should be attended to whenever the surface is moist, and everything pulled up should be burned, or put where the seeds are not likely to ripen and sow themselves. Proper Weeding-knives should always be provided along with other garden tools; the work is more readily executed with these than with old knives of other kinds, that are often made to do service. For destroying on a large scale Weeds in walks, salt may be effectually employed, scattered with the hand over the surface, during dry weather, in summer. Smith's Weed-killer, a preparation specially made for walks, has been highly spoken of. Any "destroyer" of Weeds applied to walks must be kept clear of grass and other living edges, and care must also be taken to avoid stepping from a walk on to the grass at the time when a preparation destructive to plant life is being employed.

**WEED-WIND, or WITH-WIND.** An old name for Bindweed (*Convolvulus*).

**WEeping ARBOR-VITÆ.** See *Thuya orientalis pendula*.

**WEeping ASH.** See *Fraxinus excelsior pendula*.

**WEeping BEECH.** See *Fagus sylvatica pendula*.

**WEeping CHERRY.** See *Cerasus semper-florens*.

**WEeping ELm.** See *Ulmus glabra pendula* and *U. montana pendula*.

**WEeping MOUNTAIN ASH.** See *Pyrus Aucuparia pendula*.

**WEeping OAK.** See *Quercus pedunculata pendula*.

**WEeping POPLAR.** See *Populus grandidentata pendula* and *P. Tremula pendula*.

**WEeping RED CEDAR.** See *Juniperus virginiana pendula*.

**WEeping WILLOW.** See *Salix babylonica*.

**WEEVIL-PLANT.** A common name for *Curculigo* (which see).

**WEEVILS.** The popular name for a large division of Beetles, of very great interest to the gardener and the farmer, because of the injury inflicted by many species on garden and field produce. There has been frequent occasion, in the course of this work, to refer to their ravages under various headings, the more important of which are mentioned below. The scientific name of the Weevils is *Rhynchophora* (from the Greek words *rhynchos*, a snout, and *phero*, I carry). This name bears reference to the most characteristic mark of the Weevils, viz., that the head is prolonged and narrowed forwards into a snout, on which the antennæ are placed. The snout, or beak, in many is short and flattened; but in a few (e.g., Nut-Weevil) it is very long, slender, and curved abruptly downwards. The mouth is at the end of the beak. The antennæ are very generally elbowed—i.e., the basal joint is long and slender, and the others are short, and form a row, attached to the tip of the basal joint at an angle with it. Few Weevils of temperate climates are large; most are very small. The body is very often short, rounded, and very hard, less often slender and elongate, or depressed and flattened. Like other Beetles, they undergo a complete metamorphosis, their larvæ being usually white, fleshy, legless grubs, with the head horny, dark, and furnished with strong jaws. Many of them live in the interior of fruits, or of seeds, but others burrow in leaves, or in the wood or pith of twigs, or in galls. The Beetles themselves are frequently destructive, gnawing the leaves, bark, or fruits of garden herbs and shrubs. The habits of the larvæ and of the Beetles are thus so varied, and the injuries done by them so manifold, that it would exceed our limits to enter into the full details here; but information on these points in regard to the more important species will be found under the following headings: **Apple-blossom Weevil**, **Bean Beetle**, **Cabbage Gall Weevil**, **Nut Weevil**, **Orchestes**, **Otiorynchus**, **Pea** (INSECT PESTS), **Pine-bark Beetle**, **Pine Weevils**, **Plum** (INSECT PESTS), **Raspberry** (INSECTS), **Rhynchites**, **Scolytidæ**, **Sitona**, and **Turnip-Seed Weevil**.

**WEIGELIA** (also spelt *Weigela*). This is now regarded, by the authors of the "Genera Plantarum," as synonymous with *Diervilla* (which see). The correct

*Weigelia*—continued.



FIG. 216. SEEDLING PLANT OF *WEIGELIA* (*DIERVILLA*) *ROSEA* IN FLOWER.

name of *W. rosea* (see Fig. 216) is *Diervilla rosea*, and *W. rosea monstrosa* (see Fig. 217) is now correctly named *D. rosea monstrosa*.



FIG. 217. *WEIGELIA* (*DIERVILLA*) *ROSEA MONSTROSA*.

**WEINMANNIA** (named after John William Weinmann, apothecary at Ratishon, author of "Phytanthozaiconographica," 1737). SYN. *Leiospermum*. ORD. *Savifragæ*. A genus embracing about fifty species of stove or greenhouse, glabrous or tomentose trees or shrubs, inhabiting the Malayan Peninsula and Islands, the Mascarene and Pacific Islands, Australia, New Zealand, and tropical and temperate South America. Flowers white, small, fasciated or scattered, disposed in simple, terminal and axillary, erect racemes; calyx tube short, the limb four or five-partite; petals four or five, spatulate or ovate, sessile; stamens eight or ten, inserted with the petals. Leaves opposite, coriaceous, petiolate, simple, trifoliate, or imparipinnate; leaflets usually glandular-serrated; rachis often winged; stipules variable, deciduous. Branchlets opposite, often terete. A selection of the introduced species is here given. They

**Weinmannia**—continued.

all require stove treatment, and thrive in any light, rich soil. Propagation may be effected by cuttings, inserted in sandy soil, under a glass, in heat.

**W. glabra** (smooth). *fl.* white; petals rather longer than the calyx segments; pedicels twin, shortly hirsute. January. *l.* highly glabrous on both sides, shortly petiolate, imparipinnate; leaflets three to five pairs, oblong-elliptic, slightly acute at base, the margins serrate or crenate-serrate, sometimes nearly entire. *h.* 6ft. Jamaica, 1815. Shrub.

**W. hirta** (hairy). *fl.* fascicled-racemose; stamens eight, exserted. May. *l.* leaflets three or four-jugal, six to ten lines long, elliptic, bluish, serrated above the base, pilose-pubescent chiefly beneath. Branchlets villous-hirsute. *h.* 6ft. or more. Jamaica, 1820. Tree or shrub.

**W. ovata** (ovate-leaved). *fl.* fascicles few-flowered, remote; racemes very loose, 3in. long. May. *l.* elliptic-oblong, somewhat obtuse, acute at base, crenate, 2in. to 3in. long, 1in. to 1½in. broad; petioles two to three lines long. *h.* 6ft. Peru, 1824. Glabrous tree.

**W. pinnata** (pinnate). *fl.* fascicled-racemose: stamens eight, exserted. May. *l.* leaflets three to seven-jugal, elliptic-oblong, bluish, four to eight lines long, serrated above the base, hispid on the midrib beneath, or glabrescent. Branchlets hirsute with short down. *h.* 6ft. and upwards. Jamaica, 1815. Tree. *W. glabra* is (in part) synonymous with this species.

**W. trichosperma** (hairy-seeded). *fl.* raceme loose. May. *l.* pinnate; leaflets many, oblong, acute, toothed, obliquely cuneate at base, naked and shining above, slightly pilose beneath. *h.* 4ft. Valdivia. Shrub.

**W. trifoliata** (three-leafleted). A synonym of *Platylophus trifoliata*.

**WELFIA** (named in honour of the Royal Family [Guelph] of Hanover). ORD. *Palmæ*. A small genus (two species) of stove, unarmed Palms, natives of Central America. Flowers pale yellowish-white, rather large; spathes two, deciduous; spadices thick, pendulous. Fruit dark violet, oblong, compressed, 2in. long. Leaves terminal, pinnatisect, on rather flat, short petioles; segments much narrowed at base, entire or cut at apex. *W. regia*, the only species introduced, should be grown in a compost of rich loam and leaf mould, mixed with a little old cow-dung. Propagation may be effected by seeds.

**W. regia** (royal)\*. *l.* in the young state divided almost to the base into a pair of oblong, acuminate lobes, having a pretty bronzy tint, borne on slender petioles, at length becoming pinnatisect; margins of the segments recurved at base; adult leaves with numerous unequal, narrow pinnae, decurrent on the angular rachis, whitish beneath. When fully grown, the stem attains a height of 60ft., and the leaves a length of about 20ft. New Grenada, 1869. (G. C. 1870, 764; F. M. n. s. 60; I. H. n. s. 62.)

**WELL**. A Well is not a desirable source for procuring water to give plants, as the water is invariably colder than the temperature and the soil in which the roots are situated. If, however, there is no other efficient supply, a quantity should be drawn or pumped up some time previous to being required for use, and meanwhile allowed to stand in an open tank. Well-water is also, as a rule, harder than rain-water, and is, consequently, not so well suited for administering to plants. See also **Water**.

**WELLINGTONIA**. A synonym of *Sequoia* (which see).

**WELSH NUT**. A common name for the Walnut (which see).

**WELSH POPPY**. See *Meconopsis cambrica*.

**WELWITSCHIA** (named in honour of Dr. Frederic Welwitsch, 1806-1872, a celebrated botanical traveller). SYN. *Tumbao*. ORD. *Gnetaceæ*. A monotypic genus. The species is one of the most remarkable productions of the vegetable kingdom. It is found growing in arid places in tropical and South-western Africa, where rain rarely falls. The two leaves were at first described as being simply persistent cotyledons enormously developed, but such is not the case; the two cotyledons last for some time, and when the true leaves appear. Although *W. mirabilis* "was

**Welwitschia**—continued.

first made known in Europe by Dr. Welwitsch, it appears to have been first discovered by Mr. C. J. Anderson, an eminent African traveller. This wonderful plant has been introduced into the Royal Gardens, Kew; but we do not know if it yet exists in any other establishment. It will probably prove very difficult to cultivate, on account of the impossibility of imitating the natural conditions under which it flourishes. It appears to us that the most probable method of succeeding with it would be to inclose a space within brick walls to a height of about 3ft. from the earth. This should be filled up, to a height of about 16in. or 18in., with a very light, porous soil, such as a mixture of light, sandy loam and broken bricks, in the proportion of two parts of the former to one of the latter. Above this the space should be filled in with sand and brick rubbish, mixed with a little sandy loam—about a tenth part of the latter, just to help to bind it. If planted in this way, the long, descending roots would penetrate into the lower soil, and derive sufficient nourishment and water from it, as the water would ascend into the lower stratum from the earth by capillary attraction, whilst the upper stratum being dry would prevent the plant from rotting. It should be fully exposed to the sun, and no water given it, though at evening a slight syringing over the leaves and crown would probably be beneficial, as this would in some way approach the dews to which it is subjected in its native country. The temperature should not be allowed to get below 50deg." (N. E. Brown).

**W. mirabilis** (wonderful). *fl.* solitary, contained within the scales of the young cones; cones scarlet, small, erect, at length oblong, in stout, dichotomously branched cymes, springing from near the insertion of the leaves. *l.* two, from deep grooves in the circumference of the trunk, 6ft. or more in length, quite flat, linear, very leathery, splitting with age into innumerable thongs, that lie curling on the surface of the soil. Trunk obconical, about 2ft. long, rising a few inches only above the soil, with the appearance of a flat, two-lobed, depressed mass, sometimes 14ft. in circumference; when fully grown, it is dark brown, hard, and cracked, like the burnt crust of a loaf of bread; the lower part forming a stout tap-root, buried in the soil, and branching downwards at the end. 1862 and 1878. The plant is said to last a century. (B. M. 5368-9; T. L. S. xiv. 1-14.)

**WENDLANDIA** (named in honour of Henry Ludovic Wendland, 1755-1828, once Curator of the Botanic Garden at Hanover). ORD. *Rubiaceæ*. A genus comprising about sixteen species of stove or greenhouse shrubs or small trees, inhabiting tropical and sub-tropical Asia. Flowers white, pink, or yellow, small, two or three-bracteolate, sessile or pedicellate in terminal, thyrsoid, densely many-flowered panicles; calyx lobes four or five, small; corolla tubular, salver or funnel-shaped, the lobes four or five, imbricated in bud; stamens four or five, between the corolla lobes. Leaves opposite or ternately whorled; stipules entire or bifid. For culture of the two best-known species, see **Vangueria**. Both are stove trees.

**W. paniculata** (panicked). *fl.* as in *W. tinctoria*; panicle ample. July. *l.* opposite, elliptic or elliptic-lanceolate, acuminate, 5in. to 8in. long, rarely narrow-obovate, more or less pubescent beneath; stipules recurved, broad, orbicular or oblong, with rounded tips. *h.* 6ft. India, 1820.

**W. tinctoria** (dyer's). *fl.* white, sessile, fascicled; panicles large, spreading, pubescent, pilose, or tomentose. July. *l.* opposite, elliptic, ovate, or obovate, 4in. to 8in. long, acuminate, glabrous and often shining above, paler and pubescent or rarely glabrous beneath; stipules erect, large, with a subulate point or a laterally-flattened, rigid appendage. *h.* 6ft. India, 1825.

**WENDLANDIA** (of Willdenow). A synonym of *Cocculus* (which see).

**WENSEA**. A synonym of *Pogostemon* (which see).

**WERNERIA** (named in honour of A. G. Werner, 1750-1817, Professor of Mineralogy at Friburg). ORD. *Compositæ*. A genus embracing about seventeen species of dwarf, tufted, greenhouse, perennial herbs, natives of the Andes of South America. Flower-heads large or

**Werneria**—*continued*.

mediocre, heterogamous; involucre broadly campanulate or hemispherical, with one series of bracts; receptacle flat or convex, naked; ray florets pink, yellow, or white, in one series, ligulate; disk yellow; achenes oblong or turbinate. Leaves radical or clustered on the stem, entire or rarely toothed or pinnatisect. Only one species is known to gardeners. It thrives in light soil, and may be increased by division of the roots.

**W. frigida** (frigid). *fl.* heads yellow, solitary, shortly pedunculate; involucre about thirteen-cleft, coloured. February. *l.* stellate, imbricated, linear, obtuse. *h.* 9in. Quito, 1828.

**WESTERN YEW.** See *Taxus brevifolia*.

**WEST INDIAN COCKSPUR.** See *Pisonia aculeata*.

**WEST INDIAN MUGWORT.** See *Parthenium Hysterophorus*.

**WESTRINGIA** (named in honour of J. P. Westring, a physician to the King of Sweden). *ORD. Labiate.* A genus comprising about eleven species of greenhouse shrubs, broadly dispersed over extra-tropical Australia. Flowers all axillary or rarely in terminal, leafy heads, with a pair of bracts under the calyx, usually very small and sometimes obsolete; calyx campanulate, five-toothed; corolla with a short tube, usually hairy inside, and a dilated throat, the upper lip erect but flat and broadly two-lobed, the lower one spreading, three-lobed; two upper stamens perfect, the two lower ones sterile. Leaves in whorls of three, four, or rarely more. The best-known species are here described. They thrive in any light, rich soil. Propagation may be readily effected by young cuttings, inserted in sand, under a glass.

**W. angustifolia** (narrow-leaved). A synonym of *W. rigida*.

**W. cinerea** (grey). A form of *W. rigida*.

**W. Dampieri** (Dampier's). *fl.* white, nearly sessile, about the size of those of *W. rosmariniformis*, but the corolla more hirsute. September. *l.* in whorls of four, or very rarely three, on the side branches, linear, much revolute, usually about  $\frac{1}{2}$ in. long, smooth or scabrous above, often hoary beneath. *h.* several feet. 1803. (B. M. 3306.)

**W. eremicola** (desert-loving). *fl.* pale blue, rather small, usually distant; calyx hoary; corolla pubescent. June. *l.* usually in whorls of three, narrow-linear, acute or mucronate, rarely above  $\frac{1}{2}$ in. long. Branches erect, often twiggy, more or less hoary or silky-pubescent. *h.* 3ft. 1823. (B. M. 3438; B. R. 1481, under name of *W. longifolia*.)

**W. longifolia** (long-leaved). *fl.* lilac, rather small, axillary; corolla pubescent outside, the tube usually exceeding the calyx teeth. Summer. *l.* in whorls of three, narrow-linear, mostly above  $\frac{1}{2}$ in. long, the margins somewhat revolute or nearly flat. *h.* several feet. 1878.

**W. rigida** (rigid). *fl.* as in *W. Dampieri*. *l.* mostly in whorls of three, but here and there four, linear, obtuse or mucronate, acute, rigid, with much-revolute margins, usually glabrous above when full-grown, and either smooth and shining or scabrous with minute tubercles, hoary beneath. *h.* 3ft. 1823. *Syn. W. angustifolia.* *W. cinerea* is a more hoary form. (B. M. 3307.)

**W. rosmariniformis** (Rosemary-like).\* Victorian Rosemary. *fl.* pale blue, almost sessile, all axillary; corolla pubescent outside. July. *l.* in whorls of four, oblong-lanceolate to linear, acute or obtuse,  $\frac{1}{2}$ in. to  $\frac{1}{2}$ in. long, coriaceous, glabrous and shining above, hoary or silvery-white beneath, the margins recurved or revolute. *h.* several feet. 1791. (A. B. R. 214, under name of *W. rosmarinacea*.)

**WEST WIND, FLOWER OF THE.** See *Zephyranthes*.

**WEYMOUTH PINE.** See *Pinus Strobus*.

**WHANGEE OR WANGHEE CANE.** See *Phyllostachys nigra*.

**WHEAT.** See *Triticum vulgare*.

**WHEAT, BUCK.** See *Fagopyrum esculentum*.

**WHEAT, GUINEA OR TURKEY.** See *Zea Mays*.

**WHEELBARROWS.** Wheelbarrows are amongst the most essential of garden requisites, and are invariably

**Wheelbarrows**—*continued*.

in daily use. The common Box-barrow with broad wheel is that in general use, and is best adapted for wheeling soil, rubbish, manure, &c. If wheeling on planks becomes necessary, as is sometimes the case when excavations or new walks are made, the Navy-barrow is best, as the wheel, being made of iron, does not collect soil to clog it, and the sides are set on an angle outwards to facilitate emptying readily. Flat Barrows of the shape

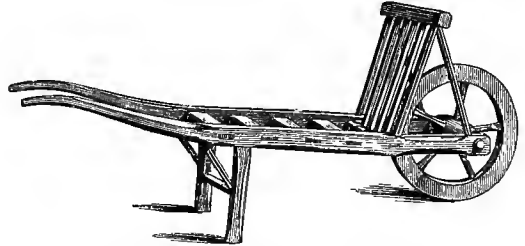


FIG. 218. FLAT MARKET-GARDEN BARROW.

represented in Fig. 218 are largely employed in market gardens for wheeling baskets of fruit, vegetables, &c., to the sheds. One, at least, of these Barrows is always useful in a garden, for the removal of boxes, hampers, or anything that cannot be readily fitted into an ordinary Wheelbarrow. It may also be employed for wheeling a water-barrel, if the use of one is necessary.

**WHIN.** See *Ulex*.

**WHINBERRY.** A common name for *Vaccinium Myrtillus* (which see).

**WHIN, PETTY.** See *Genista anglica*.

**WHIP-GRAFTING.** See *Grafting*.

**WHITE ALDER.** See *Platylophus trifoliata*.

**WHITE ANTS, or TERMITES.** Fortunately, these are not British insects; but in warm countries, and especially throughout the tropics, they abound, and do great destruction to woodwork of every kind. Only a very few kinds of wood can resist their jaws. At La Rochelle and Bordeaux, on the West coast of France, they have been introduced, and have become so abundant as to force themselves into notice by the mischief they do to the woodwork of the public offices and of dwelling-houses, and also to the public records. The Termites resemble true Ants in living in very large communities, comprising males, females, and neuters. Among the neuters may often be distinguished workers and soldiers, the latter attending only to the defence of the community, while the former do the hard work. In structure the Termites differ greatly from the true Ants, as they belong to the *Neuroptera*, while the true Ants are *Hymenoptera* (see *Insects*). Among Termites only the mature males and females are winged. The wings are about twice as long as the body; all four are of nearly equal size, and are provided with a stout front border, or nerve, and a number of slender, indistinct nerves in the other parts of the wings. When not in use they lie flat on the back. The segments of the thorax are distinct; the abdomen is flattened; the head is rather flattened, and has cutting jaws; and the legs are rather short and slender. The neuters have no wings, or have only their rudiments. Some entomologists have regarded them as larvæ and pupæ of the males and females; others believe that they never become sexually mature. The species of Termites are very numerous; those that occur in Europe are named *Termes lucifugus* and *T. ruficollis*. The nests of certain tropical species

**White Ants, or Termites**—*continued*.

are built of mud on the soil, reach a height of from 10ft. to 15ft., and are so hard as to require a pickaxe to penetrate the outer walls. Other species form nests of clay high up among the branches of trees. They always work under cover of galleries of mud, or in wood, as they hats daylight. When the males and females become winged, they leave the nest, and pair, and soon afterwards the females drop their wings, and are taken back into the nest by the workers. Here each female is inclosed in a clay cell built around her by the workers. Her abdomen grows enormously, becoming filled with eggs, of which a single female can lay as many as 80,000 in twenty-four hours. The eggs are carried away by the workers, and are carefully tended, as among bees and wasps. The number of Termites in a large nest is enormous.

As they are not likely to prove hurtful in England, there is no need to dwell upon any remedies.

**WHITE ARUM LILY.** See *Richardia africana*.

**WHITE ASH.** See *Fraxinus americana*.

**WHITE BASSWOOD, AMERICAN.** See *Tilia heterophylla*.

**WHITE BEAM-TREE.** See *Pyrus Aria*.

**WHITE BLADDER FLOWER.** See *Phytanthus albens*.

**WHITE BOTHEN, WHITE GOLDES.** Old names for *Chrysanthemum Leucanthemum*.

**WHITE BOTTLE.** A common name for *Silene inflata* (which see).

**WHITE BUTTERWOOD.** See *Trichilia spondioides*.

**WHITE CEDAR.** A common name for *Chamaecyparis*. See also *Thuya gigantea* and *T. occidentalis*.

**WHITE CYPRESS.** See *Taxodium distichum*.

**WHITE ELM.** See *Ulmus americana*.

**WHITE ERMINE MOTH.** See *Spilosoma menthastri*.

**WHITEHEADIA** (named after its discoverer, the Rev. Henry Whitehead, "to whom I am indebted for many curious plants" [Harvey]). ORD. *Liliaceæ*. A monotypic genus. The species is a greenhouse, bulbous plant. It thrives in any rich soil, and may be propagated by offsets.

**W. bifolia** (two-leaved). *fl.*, perianth light green, subsessile, solitary, four to five lines long, the segments subequal, slightly spreading above the base; stamens six, slightly exserted; raceme dense, 3in. to 6in. long; scape clavate, 1ft. long; bracts amplexicaul, 1in. to 1½in. long. April. *l.* two, opposite, roundish-oblong, glabrous, fleshy-membranous, 6in. to 8in. long, 4in. to 6in. broad, sub-acute or emarginate. Bulb fuscous, 1½in. to 2in. thick. South Africa, 1792. SYNS. *Eucomis bifolia* (B. M. 480), *Melanthium massoniæfolium* (A. B. R. 358).

**WHITE-HEART HICKORY.** See *Carya tomentosa*.

**WHITE HELLEBORE.** See *Veratrum*.

**WHITE LIME.** See *Tilia argentea*.

**WHITE PINE.** See *Pinus flexilis*.

**WHITE POTHERB.** See *Valerianella olitoria*.

**WHITE ROOT.** An old name for Solomon's Seal (*Polygonatum multiflorum*).

**WHITE SAPOTA.** A common name for *Casimiroa edulis* (which see).

**WHITETHORN.** A popular name for *Cratægus Oxyacantha* (which see).

**WHITE-TREE.** A common name for *Melaleuca leucadendron* (which see).

**WHITE WOOD.** A name applied to *Liriodendron tulipifera*, *Tilia americana*, &c.

**WHITFIELDIA** (named after T. Whitfield, a botanical collector of African plants). ORD. *Acanthaceæ*. A small genus (two species) of ornamental, stove shrubs, natives of tropical Africa. Flowers white or brick-red, shortly pedicellate, solitary in the axils of opposite bracts, disposed in a terminal raceme; calyx five-parted; corolla with five twisted lobes; stamens four, didynamous; bracteoles under the calyx, and sometimes the bracts, coloured. Leaves opposite, entire. Only one of the species has been introduced. For culture, see *Barleria*.

**W. lateritia** (brick-red).\* *fl.*, calyx brick-red, ample; corolla orange-red or brick-red, twice as long as the calyx, between campanulate and funnel-shaped; pedicels opposite, drooping. October to March. *l.* opposite, ovate or oblong-ovate, subcoriaceous, evergreen, waved, pinniveined. Branches spreading, terete, rather tortuous. *h.* 3ft. 1841. (B. M. 4155; F. d. S. 32.)

**WHITLAVIA.** This is regarded, by the authors of the "Genera Plantarum," as synonymous with *Phacelia*



FIG. 219. FLOWERING BRANCHES OF WHITLAVIA GRANDIFLORA (PHACELIA WHITLAVIA).

(which see). The proper name of *Whitlavia grandiflora* (see Fig. 219) is now *Phacelia Whitlavia*.

**WHITLEYA.** Included under *Scopolia* (which see).

**WHITLOW GRASS.** See *Draba* and *Paronychia*.

**WHITTEN-TREE.** A common name for *Viburnum Opulus* (which see).

**WHITWORT.** An old name for Feverfew (*Pyrethrum Parthenium*).

**WHORL.** A ring of organs all on the same plane.

**WHORL FLOWER.** A common name for *Morina longifolia* (which see).

**WHORTLEBERRY.** See *Vaccinium Myrtillus*. The name is also applied to other species.

**WIBORGIA.** A synonym of *Viborgia* (which see).

**WIDDRINGTONIA** (named in honour of Captain Widdrington [formerly Cook], who travelled in Spain). African Cypress. ORD. *Coniferae*. A small genus (three species) of greenhouse shrubs or trees, included, by Bentham and Hooker, under *Callitris*; two are natives of South Africa, and the third is found in Madagascar. Flowers dioecious, or male and female on separate plants; male catkins oblong or cylindrical, the females globular, without footstalks. Leaves thickly set, alternately or in whorls, linear or needle-shaped, spreading, but sometimes very small, scale-like, approaching imbricate, with a gland on the back. Cones thick, woody, nearly equally four-valved, globular, two or three together. Two species have been introduced. For culture, see *Callitris*.

**W. cupressoides** (Cypress-like). *l.* on the branches acute, somewhat spreading at the points; those on the branchlets four-rowed, much shorter, imbricated. *cones* ovate, obtuse, nine to ten lines long. Branches elongated, erect, pyramidal; branchlets slender, bent downwards, or pendent at the ends, covered with leaves. *h.* 4ft. to 10ft. South Africa, 1799. Shrub.

**W. juniperoides** (Juniper-like). Cape Gum-tree. *fl.*, male catkins oblong-cylindrical, terminal. *l.* adherent at base, decurrent, leathery, glaucous-green; young ones mostly linear or needle-shaped, sharp-pointed, spreading, slightly curved, opposite or in whorls of three,  $\frac{3}{16}$  in. to  $\frac{1}{2}$  in. long; adults scattered; those on the branchlets sometimes ovate-lanceolate or rhomboid, obtuse or sharp-pointed. *cones* three or four together, much smaller than in *W. cupressoides*, rounded, slightly depressed. Stem straight; branches erect or spreading. South Africa, 1756. Tree.

**WIDOW, MOURNFUL.** See *Scabiosa atropurpurea*.

**WIDOW-WAIL.** See *Cneorum*.

**WIDOW-WISSE.** An old name for *Genista tinctoria*.

**WIGANDIA** (named in honour of John Wigand, 1523-1587, a Bishop of Pomerania). ORD. *Hydrophyllaceae*. A small genus (three or four closely-related species) of tall, hispid, stove or greenhouse herbs, broadly dispersed over the mountainous regions of tropical America. Flowers sessile at the sides of scorpioid branches, in terminal, amply dichotomous cymes; calyx segments linear; corolla tube short, broadly campanulate, not scaly; the limb ample, spreading, of five imbricated lobes; stamens five, nearly equally affixed, often exserted; filaments hispid with reflexed pili below the middle. Leaves alternate, ample, wrinkled, generally doubly-toothed. The species are frequently, on account of their fine foliage and bold habit, used for sub-tropical bedding. Seeds should be sown in early spring, in heat; and the seedlings grown on in light, loamy soil, hardened off, and planted out in the open in June. The plants may also be propagated by means of cuttings, inserted in sandy soil, in bottom heat, and carefully shaded until rooted.

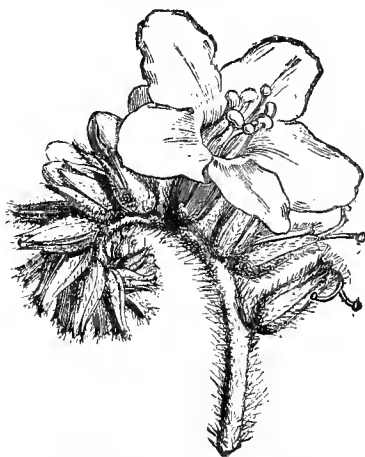


FIG. 220. PORTION OF INFLORESCENCE OF WIGANDIA MACROPHYLLA.



FIG. 221. WIGANDIA URENS.



**Wigandia**—continued.

**W. caracasana** (Caracas). A synonym of *W. macrophylla*.

**W. macrophylla** (large-leaved).\* *fl.* lilac; sepals acute, hoary-tomentose, shorter than the corolla; spikes revolute at apex, secund, the rachis villous-pubescent. April. *l.* elliptic-cordate, slightly acute, hairy-tomentose, ferruginous above. *h.* 10ft. Caracas, 1836. See Fig. 220. *SYN.* *W. caracasana* (B. M. 4575; B. R. 1966; F. d. S. 755; L. J. F. 132).

**W. urens** (stinging). *fl.* disposed in scorpioid panicles; calyx woolly, with linear, acute sepals; corolla violet-blue, the margins of the lobes somewhat revolute. Autumn. *h.* 6ft. Mexico (?), 1830. This species differs from *W. macrophylla* in its looser habit, and in its longer-stalked, more spreading leaves of a deeper ashy-green, shaded with red on the petioles. See Fig. 221.



FIG. 222. WIGANDIA VIGIERI.

**W. Vigieri** (Vigier's).\* *fl.*, calyx green, exceeding the corolla tube, with five linear, acute sepals; corolla lilac-blue, passing through vinous-red to fawn-colour before fading, rotate-infundibular, woolly outside, glabrous; inflorescence very large, paniculate, divaricate. Autumn. *l.* alternate, oval-elliptic, cordate at the base, irregularly and sparsely toothed, channelled; petioles 9in. long. *h.* 6ft. Mexico (?), 1858. See Fig. 222.

**WIG-TREE.** A common name for *Rhus Cotinus* (which see).

**WIKSTRÖMIA.** A synonym of *Laplacea* (which see).

**WILD APPLE, or WILDING.** See *Pyrus Malus*.

**WILD BERGAMOT.** See *Monarda fistulosa*.

**WILD CLARY.** See *Salvia Verbenaca*.

**WILD CLOVE** See *Pimenta acris*.

**WILD DATE.** See *Phoenix sylvestris*.

**WILD HYACINTH.** See *Scilla nutans*.

**WILD IRISHMAN.** See *Discaria Toumatou*.

**WILD OLIVE.** See *Elæagnus* and *Olea europæa*.

**WILD SNOWBALL.** See *Ceanothus americanus*.

**WILD WATER LEMON.** See *Passiflora foetida*.

**WILD WILLIAM.** An old name for *Lychuis Flos-cuculi*.

**WILLDENOVIA** (of Gmelin). A synonym of *Rondeletia* (which see).

**WILLDENOWIA** (named in honour of Charles Louis Willdenow, 1765-1812, Professor of Botany at Berlin). *SYN.* *Nematanthus* (of Nees). *ORD.* *Restiaceæ*. A genus comprising eight species of greenhouse herbs, with Rush-like, leafless stems, natives of South Africa. Flowers dioecious; male spikelets loosely many-flowered, interruptedly spicate; females one-flowered, sessile. Sheaths loose, persistent. It is doubtful whether the under-mentioned species is still in cultivation. It thrives in a compost of loam and peat, and may be increased by divisions.

**W. tores** (terete). *fl.*, male inflorescence 2in. to 2½in. long, erect, spicately or paniculately cymose; female spikelets one to three at the apex of the culm. Sheaths 1½in. in length, convolute, fuscous, glabrous, acuminate at apex. Culms erect, 3ft. or more high, terete, virgate-branched near the middle; branches ascending, white-lipidated and spotted with purple. 1790. The plant sometimes grown under this name is a species of *Restia*.

**WILLEMETIA** (named in honour of P. R. Willemet, 1762-1790, author of "Herbarium Mauritanium"). *SYNS.* *Noltia*, *Vittmannia*. *ORD.* *Rhamneæ*. A monotypic genus. The species is a pretty, perfectly glabrous, greenhouse shrub. It thrives in a compost of sandy loam and peat. Increased by cuttings, inserted in sand, under a glass.

**W. africana** (African). *fl.* white, in cymes and panicles about lin. long; petals five, cucullate, sessile. May. *l.* alternate, oblong-lanceolate, more or less obtuse, serrated, feather-nerved, 2in. to 2½in. long, paler beneath. *h.* 10ft. to 12ft. South Africa. The proper name of this plant is now *Noltia africana*.

**WILLEDSEN PAPER AND CANVAS.** For making temporary shelters where light is not necessary, the Paper and Canvas manufactured by the Willesden Paper Company possess all the requisite properties; being fairly cheap, they may be freely used for light coverings of any kind. The Paper is quite waterproof, light, and of fair tensile strength, as anyone who saw the pavilion erected in the grounds of the Crystal Palace, during the exhibition of 1884, will have noticed; except that visitors had cut the Paper about, the edifice was as sound nine months after erection as when first put up. A tank was also exhibited, which held about half a ton of water, the Paper not being saturated for quite two months; and no doubt it would have been sound for the whole time the exhibition lasted, but that some mischievous person stuck a knife through the side, to see if it was really Paper. These examples will show that the Paper will answer what is required of it, and therefore all that is left is to describe the manner of using it for garden purposes.

The stout brown Paper is the best for general use. It is made about 4½ft. wide, a useful size for temporary

**Willesden Paper and Canvas**—*continued*.

roofs, and for screens to put over frames or plants. So far as roofs are concerned, the makers give full directions, and therefore this part of the subject need not be considered here. The most useful appliances in any garden, for providing temporary shelter, are a number of frames about 6ft. long and the width of the paper. The woodwork should be about 1½ in. in thickness, and should be braced across to keep the whole structure rigid. Over these frames the Paper should be nailed, preferably on both sides; thoroughly waterproof coverings, which will keep off a fair amount of frost, are thus made for protecting tender subjects in frames or beds, while for outdoor Mushroom-beds they are most convenient. Being flat and comparatively thin, a large number can be stowed away in a little space, when not required for active use. For wall trees of doubtful hardiness, the prepared Canvas, if put on frames, makes a good protective medium when the shelters are made as above, and, having more tensile strength than the Paper, will not be torn with any ordinary usage.

Besides being made into flat screens, wooden frames of different patterns, such as spans, and similar forms, can be constructed in light wooden framing, and covered with Willesden Paper, affording very decent protection against frost and snow to plants of doubtful hardiness in the borders. Larger frames can also be made for the protection of shrubs, &c. In all cases the Paper can be adapted to almost any form required, and a little ingenuity on the part of the user will lead to the construction of many most useful contrivances.

The lighter samples can also be used for packing plants; being waterproof, they prevent undue evaporation. For lining baskets containing cut flowers or plants, the Paper should be found very useful, as it can be made to fit the shape of the basket or hamper, and will last for a long time. Many things, such as hard-wooded cuttings, rose-buds, and similar stock, can be rolled in the Paper, the ends being folded over, and they will travel as well as in lead foil or rubber tissue, and at less cost. Waterproof labels, for writing on which no special ink is required, are also made of Willesden Paper; these are durable, and, being made in various sizes, are useful for many purposes. In fact, there is practically no end to the purposes to which this Paper can be applied in and about the garden.

**WILLOW.** See *Salix*.

**WILLOW, AMERICAN WATER.** A common name for *Dianthera americana* (which see).

**WILLOW, FRENCH OR PERSIAN.** See *Epilobium angustifolium*.

**WILLOW GRASS.** See *Polygonum amphibium*.

**WILLOW HERB.** See *Epilobium*.

**WILLOW HORNET CLEARWING MOTH.** See *Sesia*.

**WILLOW, KILMARNOCK WEeping.** See *Salix Caprea pendula*.

**WILLOW SAWFLIES.** Few, if any, plants are more liable than Willows to be injured by Sawflies. By far the larger number of the species that feed on Willows and Sallows belong to the genus *Nematus*, but a few belong to two or three other genera. It would be useless to attempt to describe, or even to enumerate, the many kinds that have been found on the different species of *Salix*; suffice it to say that Cameron, in his "Monograph of British Phytophagous Hymenoptera," enumerates as British thirty-three species of *Nematus*, and twenty species under other genera, found on *Salix*; and that yet others have been recorded from the Continent of Europe as found on Willows.

**Willow Sawflies**—*continued*.

We cannot, therefore, do more than indicate briefly the chief modes in which these insects may prove hurtful.

The larvæ of many species feed, exposed to view, on the edges or the lower surface of the leaves, often keeping the hinder part of their bodies coiled in a spiral. Others live between folded or rolled leaves; and a few live in mines in the leaf-blades. Many species are Gall-makers; and of these the habits and the galls vary greatly. Several species, chiefly of *Eunura*, produce swellings of the branches, mostly in those of the cinerea section of *Salix*. Each swelling is occupied by one larva. Others, mostly species of *Nematus*, produce galls of two or three forms on the leaves. One common kind of gall resembles peas in form and size, and is usually adherent to the lower surface; though on some Willows (e.g., *S. purpurea*) the galls are more often fixed to the upper surface. The Pea Galls vary in surface-appendages according to the species of Willow, being smooth on some, downy on others. They are formed by *Nematus pedunculii*, and by several other species of this genus of Sawflies. Another very common form of gall on Willow leaves—often distinguished as "Bean Galls," from their shape—sometimes resembles small haricot beans in pairs, side by side, in the tissue of the leaf, projecting about equally from both of its surfaces. They are usually about ½ in. long by ¼ in. broad. They are green or red on the upper surface, pale green below, and may be smooth or downy, according to the kind of Willow on which they are formed. One of the commonest Gall-makers of this group is *Nematus gallicola*, which makes the galls so often seen on the leaves of *Salix alba*, *S. Caprea*, *S. fragilis*, and other Willows; other species form somewhat similar galls on several of the smaller Willows, e.g., *Salix Lapponum*, *S. nigricans*, *S. phylicifolia*, &c.; but it is impossible, in the brief space at disposal, to enter into a fuller discussion of these galls and their makers.

Remedies are scarcely called for unless the larvæ of Willow Sawflies are very plentiful. If so numerous as to endanger the health of the plants, those larvæ that feed exposed on the leaves may be dislodged by jarring or shaking the branches. They may be shaken into a vessel, and destroyed by having boiling water poured over them; or a ring of tar and cart-grease painted round the base of each tree will prevent them from crawling up again. The only reliable remedy against larvæ in rolled or mined leaves, or in galls, is hand-picking; but the damage is seldom so great as to call for so tedious and costly a remedy. As by far the greater number of the species burrow into the soil to become pupæ, any means to prevent their doing so tends to lessen the numbers of the insects. Rolling the ground below the trees, so as to render it compact, and applications of gas-lime, soot, or other substances poisonous or disagreeable to the insects, will prove useful in this way.

**WILLUGHBEYA.** A synonym of *Mikania* (which see).

**WILLUGHBEIA** (named after Francis Willughby, 1635-1672, an English naturalist, pupil of Ray). SYN. *Ancylodactylus*. ORD. *Apocynaceæ*. A genus comprising eight or ten Malayan and East Asiatic species of stove, sarmentose or tall-climbing shrubs, all supposed to yield caoutchouc. Flowers in axillary cymes; calyx short, five-lobed; corolla salver-shaped, the tube nearly glabrous within, the mouth naked or with fleshy glands alternating with the lobes; stamens included in the tube. Berry large, globose or ovoid, many-seeded. Leaves opposite, on short petioles. For culture of *W. edulis*, the only species introduced, see *Allamanda*.

**W. edulis** (edible). *fl.* of a pale pink colour; cymes on short, stout peduncles. July. *fr.* edible, sub-ovoid, the size of a lemon. l. 4 in. to 7 in. long, oblong or obovate-oblong, obtusely acuminate or caudate, acute at base, thinly coriaceous; petioles ½ in. to ¾ in. long. India, 1818. An immense climber.

**WILLUGHBEIA** (of Klotzsch). A synonym of *Landolphia* (which see).

**WIND.** The various points from which the Wind proceeds, and the amount of its force, are matters requiring daily consideration in the proper management of glass structures, and for the preservation against injury of plants and trees outside. The damage caused by a rough gale is often of a most disastrous nature; sometimes large and valuable trees are uprooted, or have their branches torn off, causing permanent disfigurement. In different localities and situations, what are known as the prevailing Winds have to be taken into account in planting operations: in some, the gales most frequently proceed from one particular point—south-west, for instance—while in others, a wood, hill, or large belt of trees may afford protection from that, but not from some other direction. Situations on various parts of the sea-coast, and also inland, will be locally affected in regard to prevailing Winds. The destruction caused by the Wind to fruit crops is, unfortunately, too familiar. Newly-planted trees of all kinds, of sufficient size to be rocked to and fro by the force of the Wind, should always be secured with stakes for the first season, after which their roots will have generally taken a good hold, thus rendering them safe. Plants in pots—*Chrysanthemums*, for example—are soon destroyed by a gale if not securely staked and tied. A cold Wind has a most injurious effect on the tender foliage of trees and plants in glass structures, particularly in early spring, when too frequently it proceeds from an easterly or north-easterly direction. Preventive measures should be adopted, as far as possible, beforehand, so that when the Wind's force is suddenly increased to a gale, everything may be secured against injury. Not unfrequently, the proper provision which it is necessary to make against rough weather is forgotten when trees are newly planted; or plants in pots are placed in exposed situations during a calm period; and the effects of the first rough Wind are disastrous.

**WINDFALL.** A term frequently applied to such fruits as may often be found lying in an immature condition below the trees, e.g., Apples, &c. The young fruits may be knocked off by one branch striking on another in a high wind; but very frequently the cause of the premature fall will be found, on careful examination, to be the presence of some parasite in the fruit. The most frequent cause is a larva feeding on the seeds, e.g., the Apple or Codlin Grub (*Carpocapsa pomonana*) in immature Apples. Such larvae generally leave the fruit very soon after its fall, to burrow in the soil, and there to become pupæ. It is, therefore, very desirable to prevent future harm by having the Windfalls picked up without delay, and given to pigs, or placed where the larvae may be unable to find a favourable situation for becoming pupæ.

**WIND FLOWER.** See *Anemone* and *Gentiana Pneumonanthe*.

**WINDOW GARDEN.** Many cottagers and amateurs who have no glass structure at their command take an especial interest in plant cultivation, and set admirable examples of what may be accomplished by constant attention, even in an ordinary window. Window Gardening has of late years made rapid strides, partly from the encouragement given to it locally by the managers of annual exhibitions, and even more so by the greater interest in the cultivation of flowers which has become so generally diffused. By the term Window Gardening, the cultivation of plants in a window, or on the sill outside in favourable weather, should only be referred to; decorative subjects that are grown to perfection elsewhere, and then used temporarily for windows, ought not to be judged in comparison. Windows facing south, or nearly so, are best adapted for plants generally; but many sub-

**Window Garden—continued.**

jects will succeed admirably in less favourable aspects. The general potting of window plants is best attended to in spring, when the drainage must be rendered complete. As a rule, it is necessary to use saucers to prevent water running into the room; the water should be emptied out so soon as the plant is well soaked. When water is required—and this time can only be known by practice—a good soaking should be given, and in summer an occasional sprinkling over the foliage, through a fine rose or syringe, generally helps to keep the plants clean and in health. During severe frost, window plants are at times unsafe in their usual quarters; they should then be placed temporarily on the floor for the night; in the day-time, where there is a fire in the room, plants are usually safe in the window, unless they are of an exceptionally tender kind. Amongst window plants that generally succeed well, Zonal Pelargoniums, of various sorts, perhaps take first place; the scented-leaved ones are also great favourites. Other subjects which may readily be adapted to culture in the same position are: *Fuchsias*, *Calceolarias*, some of the dwarf *Campanulas*, Chinese *Primulas*, several kinds of Cacti, greenhouse Ferns, spring-flowering bulbs (such as *Hyacinths* and *Tulips*), *Heliotropes*, *Myrtles*, &c. Many more might be enumerated, but those mentioned afford a great selection. *Richardia africana* and *Vallota purpurea* sometimes succeed as window plants.

**WINDROOT.** See *Asclepias tuberosa*.

**WIND ROSE.** See *Rœmeria hybrida*.

**WINEBERRY.** An old name for the Whortleberry (*Vaccinium Myrtillus*).

**WINE PALM, EAST INDIAN.** See *Phoenix sylvestris*.

**WINGS.** The two lateral petals of a papilionaceous corolla; any kind of membranous expansion.

**WINTERA.** A synonym of *Drimys* (which see).

**WINTER ACONITE.** See *Eranthis*.

**WINTERANA.** A synonym of *Canella* (which see).

**WINTERBERRY.** A common name for several species of *Ilex* (which see).

**WINTER BLOOM.** A common name for *Hamelis virginica* (which see).

**WINTER CHERRY.** See *Physalis Alkekengi*.

**WINTER CLOVER.** A common name for *Mitchella repens* (which see).

**WINTER CRESS.** See *Barbarea*.

**WINTER DAFFODIL.** See *Sternbergia lutea*.

**WINTER GARDEN.** A term usually employed to denote a very large, cool, glass structure, from which the frost is merely excluded, the interior being occupied by subjects insufficiently hardy to withstand our climate outside during the winter. A Winter Garden is generally of sufficient size to allow of the centre part of the interior being laid out in walks and large beds. The latter are planted with all the stronger-growing occupants that cannot be properly accommodated in pots. Amongst them Himalayan *Rhododendrons* may be specially mentioned, as their foliage is attractive at all seasons, and their flowers in spring and summer are amongst the most beautiful; *Camellias*, Australian *Acacias*, and other hard-wooded plants of a like description, *Araucarias*, many Tree Ferns, Palms, and any good plants that only require a little protection in winter. A Winter Garden, if treated as a conservatory, would admit of the introduction of all greenhouse plants in their seasons on the shelves

**Winter Garden**—*continued*.

around, while the central beds might be planted with some of the subjects mentioned above, according to the available height and space. Tea Roses may be trained to pillars, also on the roof, if convenient, and numerous beautiful conservatory climbers succeed well when similarly situated and kept tied.

**WINTERGREEN.** See *Pyrola*.

**WINTERGREEN, AROMATIC OR CREEPING.** See *Gaultheria procumbens*.

**WINTERGREEN, CHICKWEED.** See *Trientalis*.

**WINTER MOTHS.** A name given, because of the time of their appearance, to certain moths belonging to the group *Geometrina* (see **Moths**), which is characterised by the possession of a slender body, and wings large relatively to their size of body. Of the Winter Moths, however, the females are wingless, or, rather, possess mere vestiges of wings, utterly useless as organs of flight; the males are well provided with wings of considerable size. Most of the species are included in the genus *Hybernia* (which see); but the insect to which the name is peculiarly applied, and which is most widely destructive, is *Cheimatobia brumata*. In this species the spread of wings of the male may reach about 1½ in.; but it is usually under this size. Both sexes are greyish-brown, with several indistinct, darker, wavy lines or bands across the wings. The female is heavier in the body, and has extremely small front wings. The moths appear between the beginning of October and the end of December. The females must crawl up the trees to reach a suitable situation for laying eggs; or they may, at times, be carried from one place to another by the males. The eggs are usually laid in the crevices of the bark, and in other places fitted to give them protection. The larvæ are bluish-green, with a narrow, dark stripe down the middle of the back, and three narrow, white stripes on each side. In some the ground-colour is smoky or dark brown. They live upon almost all kinds of trees and shrubs. At first, they eat into the buds in early spring; and, when the leaves begin to enlarge, the larvæ spin two or more leaves together, and feed, protected between them, in safety. When full-fed, they lower themselves to the ground, burrow into it, and form earthen cocoons, in which they become pupæ about the end of May or the beginning of June.

**Remedies.** The larvæ of *C. brumata* are so destructive that it is often most desirable to prevent or to check their ravages. Nothing can be done while the larvæ are in the buds; but, when nearly full-fed, and living between the leaves, they can be dislodged by beating and shaking the branches. The shock causes them to lower themselves by silken threads, or to fall to the ground. They can thus be collected in cloths spread below the plants, or crushed under foot. It is well to put a belt of some sticky substance on the base of the tree-trunks, to prevent the re-ascent of larvæ. Digging the soil around the roots helps also to lessen the number of pupæ, by exposing them to the quick eyes of birds, or to predaceous insects. The most effectual remedies are those employed for the destruction of the females, and for the prevention of their ascent of the tree-trunks. This is effected readily, because of the useless nature of their wings, which compels them to creep up the trunk, unless at times carried on to the trees attached to the males. Whatever substance is used, it must remain soft and sticky for a day or two, must not injure the trunks, and must be renewed sufficiently often to keep the surface of the ring of bark sticky, say about each second day. Among the best of the compounds for catching female moths is the substance known as Davidson's Composition, or a mixture of tar and grease in equal proportions.

**WINTERSWEET.** See *Toxicophlæa spectabilis*.

**WINTER WOLF'S-BANE.** A common name for *Eranthis hyemalis* (which see).

**WIRE.** Wire is extremely useful to florists and gardeners, who could not well do without it in making up bouquets and other personal decorations. Various thicknesses are used, according to the special purpose for which it is required: for instance, when flowers have to be provided with artificial stalks, short lengths of stiff Wire, known as "stubbis," are used. These are generally procured in bundles, cut into 6in. or 8in. lengths, which are found most convenient. Binding Wire is very fine, and is largely employed in bouquet-making for securing the short lengths, already referred to, to the flowers, and for tying all the stalks together. It is wound on reels, and is strong, although quite pliable.

The springs sometimes used for fixing certain kinds of flowers in bouquets, so that they shall move about, may be readily made by binding tightly the piece of small Wire which it is intended should form the spring round a piece of a rather larger size, and then slipping off the coil.

Wire is largely employed for both movable and permanent trellises in glass houses, &c.; for this purpose, it is best galvanised, to prevent rusting. Copper binding Wire, in quantities according to requirements, should be kept in stock; it is often useful, and there are small and large gauges of this made, as well as of iron, the other principal metal used in Wire-making. Wire netting, and its various uses, such as preserving vegetable crops from destruction by rabbits, &c., are familiar to everyone. The "mesh" refers to the size of the spaces; thus Wire netting of 1in. mesh has the spaces that distance across, and so on with other finer or coarser sorts.

**WIREWORMS.** The popular name of certain pale yellowish-brown, slender larvæ, possessed of skins so tough and hard that they look and feel not unlike short pieces of moderately thick wire, flattened from above downwards. The body is of uniform thickness, and is marked with rings showing the divisions between the



FIG. 223. WIREWORM.

segments of which it consists (see Fig. 223). The head is small, flattened, and darker than the body. The three front body-rings bear each a pair of short, brown, true legs, and there is a solitary prehensile foot on the lower surface of the conical hindmost segment of the body. Wireworms feed near the surface of the soil, but concealed in it; and they gnaw the stems and roots of plants just below its surface. The plants are thereby killed, or, at least, very much injured; and the crops in gardens, as well as in the fields, are, occasionally, seriously damaged from this cause. When the Wireworms reach their full size, they burrow into the soil to a considerable depth, and each forms for itself an earthen cocoon. In this it becomes a pupa, usually about the end of summer. Many of the Beetles emerge after spending little more than a fortnight in the pupa state, but some, probably, do not emerge till the next spring or summer. Wireworms vary in size to some extent, as they are the larvæ of many kinds of Beetles, all belonging to the family *Elateridae*, but they seldom reach 1in. in length. They feed on almost all kinds of herbaceous plants, but it has been observed that they avoid Mustard: hence it has been suggested that this plant should be sown in ground that is much infested by them, in order to starve them out.

The Beetles are well known under one or other of

**Wireworms**—*continued*.

the names Click Beetle, Snap Beetle, Spring Beetle, or Skipjack. All four names allude to the method by which the insects, when laid on their backs, right themselves, and which is described below. There are many species of Click Beetles distributed amongst numerous genera, which differ among themselves in minor peculiarities; but all of them have so strong a family likeness that they are easily recognised as members of the family *Elatæridæ*. Their form is elongated, with nearly parallel sides, but the body is rather pointed behind; the surface is hard. The head is deeply sunk in the thorax; the latter is prolonged backwards at the hinder angles into two sharp points, which prevent lateral movements of the abdomen; it has a sharp, prominent spine on its front part below, and this spine fits into a groove in front of the base of the middle legs. The antennæ, which are often serrated, can be laid, for protection, into grooves on the lower surface of the head—one on each side. The legs are short, but the wings are large and powerful. The Beetles are usually black, often with the basal two-thirds of the elytra some shade between rusty-red and blood-red, less often with short, fuscous or yellowish hairs spread uniformly over the surface, or restricted to defined spots or patches. They seldom exceed  $\frac{3}{4}$  in. or fall below  $\frac{1}{4}$  in. in length. The number of British species of this family is large, and the Beetles are abundant everywhere during autumn; but only a few of the species are large enough to be familiarly known by anyone except an entomologist. They may be often seen crawling on walls and among herbage. When approached, they allow themselves to drop for concealment; and their form renders them very liable to fall on their back. Their legs are too short to be of service in turning themselves over; but the spine on the breast is an efficient organ for this purpose. When one of the insects wishes to replace itself on its legs, it bends the body backwards till it rests only on the head and the tip of the abdomen. In this position the spine is dragged out of its groove, but, on the Beetle bringing the head up smartly, the spine springs back into its groove, and the back of the Beetle is struck so hard against the surface on which it lies, that the insect is thrown some inches into the air, like a skipjack, and usually falls on its legs. The names Skipjack and Spring Beetle refer to this power of leaping; Click Beetle and Snap Beetle refer to the sound produced in the leap. It is probable that the larvæ of almost all of the *Elatæridæ* are Wireworms in appearance and in habits; but only a few of the species are known to be very injurious to garden and field produce; and some, at least, feed on decaying vegetable tissues.

The following are the most hurtful species, according to the observations of those entomologists who have most carefully studied the subject: *Agriotes sputator*, *A. lineatus*, and *A. obscurus*. The first of these is little more than  $\frac{1}{2}$  in. long, and is black, and slightly glossy, but is pubescent; the front edge and hinder angles of the thorax, and the greater part of the elytra, are dull yellowish-brown or dusky; the legs and antennæ are paler; the elytra are deeply punctate-striate. The other two species are about  $\frac{1}{2}$  in. or  $\frac{3}{4}$  in. long, and are thought by some to be forms of a single species. *A. lineatus* is fuscous, with greyish pubescence; the thorax is nearly black; the elytra are punctate-striate, the striæ (in pairs) greyish, the interspaces brown, so that the elytra are striped lengthwise with dull grey and brown; the limbs are rusty-red. *A. obscurus* is dull brown-black, with dark pubescence, the elytra faintly punctate-striate, and nearly black; the thighs are nearly black, the rest of the legs and the antennæ dull rusty-red. Still another species is probably a serious foe to cultivated plants at times. This is *Athous hæmorrhoidalis*; the insect is from  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long,

**Wireworms**—*continued*.

and is dusky-black, with the elytra brownish; the limbs are dull red, except the black thighs. In the perfect state these insects are harmless: the damage is done only in the larval condition. This stage has been observed to continue in *A. lineatus* during five years; hence, the larvæ have time to do much mischief. It would be useless to enumerate all the plants on which they have been observed to feed; but among the more important garden plants are Cabbages, Carrots, Dahlias, Irises, Lettuces, Onions, Pinks, Potatoes, Turnips, and other favourites. They also often seriously injure the grass in lawns. Where ground is allowed to lie unbroken for a time, they multiply, and from it they spread to the adjoining pieces of ground. When soil that has lain fallow, or has been a lawn for some years, is broken up, the crops grown in it are apt to suffer severely from attacks of Wireworm.

**Remedies.** When the larvæ are very numerous, the soil should be broken up, as this exposes the Wireworms to the eyes of birds. Deep-trenching has also been recommended as a useful measure. If practicable, one of the most successful methods is to starve out the larvæ by allowing the ground to lie fallow for a year, merely cutting down and destroying the weeds on it; or a crop of Mustard (*Brassica alba*) may be grown on it, as the larvæ avoid this plant. Frequent stirring of the soil is unfavourable to them; and so, to a slight extent, is the employment of a heavy roller. Various applications to the soil have been used with success. On ground allowed to lie fallow for a year, a good coating of fresh gas-lime is of great use; but where crops have to be grown without a break of this kind, soot and guano are better, scattered before or during heavy rain. One part of nitrate of soda to two of common salt has also worked well. In gardens, paraffin has been used in solution (one in fifteen) with success, for watering infested plants, or along drills of Carrots, &c. Where any plants are fading without apparent cause, the roots should be examined for Wireworms, and one of the remedies recommended above should be applied to the injured plants. Traps for Wireworms, formed of pieces of lettuce, carrot, or other favourite food, may also be used. These should be buried a little below the surface, and removed, examined every day, and the Wireworms on them collected and destroyed.

**WISTARIA** (named in honour of Caspar Wistar, 1761-1818, Professor of Anatomy in the University of Pennsylvania). Grape-flower Vine. **SYNS.** *Diplonyx* and *Thyrsanthus*. **ORD.** *Leguminosæ*. A small genus (four or five species) of hardy, tall, climbing, deciduous shrubs, natives of North America, China, and Japan. Flowers usually bluish, scattered at the sides of the rachis; two upper calyx teeth short and sub-conate, the lower ones usually longer; standard ample, with two parallel ridges at the base; wings ohlong-falcate; racemes terminal; bracts very caducous. Pods elongated, torulose, two-valved. Leaves imparipinnate; leaflets entire, pinniveined and reticulate-venulose, often stipellate. Wistarias thrive in any good, loamy soil, and grow fast when once established. They are most readily propagated by layering the young growing shoots during the summer months, and detaching them from the parent plant the following year.

**W. brachybotrys** (short-clustered). *f.* violet-purple; standard orbicular; pedicels one-flowered, shorter than the acuminate, caducous bracts; racemes short, erect or loosely spreading. April. *l.* imparipinnate, four to six-jugate; leaflets petiolulate, truncate or sub-cordate at base, ovate-lanceolate, acuminate, silky-canescens on both sides. Branches tortuous. *h.* 3ft. to 5ft. Japan. (*F. d.* S. 880; *S. Z.* F. J. 45.)

**W. chinensis** (Chinese).\* Chinese Kidney-bean Tree. *f.* large, inodorous, produced in great abundance on established plants; wings of the corolla each having one auricle. May and June (sometimes a second crop of flowers in August). *l.* leaflets ovate, acuminate, in opposite, distant pairs, clothed on both sides with a thin, silky, adpressed pubescence. China, 1816. See Fig. 224.

**Wistaria**—continued.

SYNS. *W. sinensis*, *Glycine chinensis* B. M. 2083), *G. sinensis* (B. R. 650; L. B. C. 773).

**W. c. flore-pleno** (double-flowered). A handsome variety, with double flowers. 1882. (F. & P. 1882, 557.)

**W. c. macrobotrys** (large-clustered). *fl.* white, tinted with bluish-purple, borne in very long racemes. Japan, 1870.

**W. c. variegata** (variegated). A form with bright silvery-variegated foliage. 1886.



FIG. 224. PORTION OF FLOWERING BRANCH OF *WISTARIA CHINENSIS*.

**W. frutescens** (shrubby). American Kidney-bean Tree. *fl.* odorous; racemes 4 in. to 6 in. long, 2 in. to 3 in. in diameter, on short branches, dense-flowered; bracts large, caducous. April and May. *fr.*, pods one or several-seeded. *l.*, young ones (and branches) silky-pubescent; leaflets nine to thirteen, 1 in. long, ovate-lanceolate or oblong; stipels none. North America, 1724. SYNS. *Glycine frutescens* (B. M. 2103) and *Thyrsanthus frutescens*.

**W. japonica** (Japanese).\* *fl.* white, in simple, nodding racemes; standard obovate, entire; pedicels one-flowered, horizontally spreading, terete; peduncles slender. July and August. *l.* imparipinnate, four to six-jugate; leaflets pedicellate, ovate or ovate-lanceolate, obtuse, acuminate, entire, petiolulate. Japan. A glabrous, twining shrub. (S. Z. F. J. 43.)

**W. multijuga** (many-paired). *fl.* lilac, with purple wings and keel, rather smaller than in *W. chinensis*, and growing in racemes which are said to be upwards of 2 ft. in length. Summer. *l.* pinnate; leaflets numerous, elliptic-ovate, acuminate. Japan, 1874. (F. d. S. 2002.)

**W. sinensis** (Chinese). A synonym of *W. chinensis*.

**WISTARIA, TUBEROUS-ROOTED.** See *Apios tuberosa*.

**WITCHES' THIMBLE.** See *Silene maritima*.

**WITCH HAZEL.** See *Hamamelis*.

**WITCH KNOTS.** The name popularly bestowed on the curious clusters of twigs (looking very much like the nest of a rook, or some other large bird, when seen from a distance) that so frequently occur on the larger branches of Birch, Hornbeam, and certain other trees. The twigs are usually somewhat swollen, and both they and the sickly-looking leaves upon them are duller green than usual, and frequently show a slightly velvety surface. The causes of these deformities escaped detection till they were carefully investigated a few years ago with the microscope, and were found to differ in various trees.

**Witch Knots**—continued.

In Birch and Hornbeam, they are the work of minute Fungi, belonging to a very lowly group of *Ascomycetes*. The mycelium of the Fungi lives in the tissues of the host-plant's leaves and bark; and the velvety appearance mentioned above results from the outgrowth over the whole epidermis of the organs of reproduction. These latter consist of asci (see **Pyrenomycetes**) in each

of which eight (or more) spores are formed, and from which they are scattered when mature. The asci in *Eoascus* (as the most important genus of Witch Knot Fungi is called) are quite exposed to casualties from without, instead of being inclosed in a perithecium, as in *Pyrenomycetes*. The number of asci and of spores is immense; but they are far too small individually to be detected, except when thin sections of the diseased parts are examined with a lens of high magnifying power. The following species of *Eoascus* give rise to Witch Knots: *E. turgidus*, on Birch; *E. Carpinii*, on Hornbeam; and *E. Institiæ*, on Bullace. It may be noted that other species of the genus produce distortions of the leaves of various trees and shrubs (Poplars, Alder, Elm, Cherry, &c.), and that *E. Pruni* is the cause of the disease of the fruit in various species of *Prunus* known as "Bladder Plums."

In the Birch, a diseased condition, a good deal like a young Witch Knot, is often of frequent occurrence. It is the work of a species of *Phytoptus* or Gall-mite (see **Mites**), and results from the stimulation, by the myriads of minute Mites, of the growing tissues in the buds, which are increased in size, but never develop properly. The buds in the axils of the leaf-scales, instead of remaining undeveloped, enlarge to a

conspicuous size, or grow into stunted branches; and on this process being repeated year after year, the mass of buds, &c., may reach the size of a cricket ball, but is usually smaller. There is no real difficulty in distinguishing these Mite Galls from true Witch Knots caused by Fungi. The Silver Fir (*Abies pectinata*) occasionally bears Witch Knots, which are made up of a central swelling of the stem, or of a large limb. From this arise one or more branches, on which grow very many small branches crowded densely together. The needles are short, thick, brittle, and bright green. All parts of the Witch Knots are traversed by mycelium; and the leaves bear over their surfaces numerous small, yellow, membranous cups, filled with minute, yellow spores for reproduction. These are the characteristic "fruits" of a Fungus named *Æcidium elatinum*. This Fungus renders the stems, &c., brittle, and liable to injury from wind; and it also causes the leaves to fall early.

**Treatment.** The only method likely to be of use is to cut off and burn Witch Knots of all kinds, to prevent the diseases from being propagated by the spores.

**WITCH OR WYCH ELM.** See *Ulmus montana*.

**WITHERINGIA** (name commemorative of William Withering, of Birmingham, 1741-1799, author of a "Botanical Arrangement of the Vegetables of Great Britain," 1776). SYNS. *Aureliana*, *Bassovia* (now the correct name). ORD. *Solanaceæ*. A genus comprising about a dozen species of stove or greenhouse, erect or



**Witheringia**—*continued*.

sarmentose shrubs or small trees, rarely tall herbs, natives of South and Central America and the West Indies. Flowers often rather small; calyx five to ten-toothed; corolla deeply five-cleft; pedicels often fascicled, umbellate, solitary or twin. Leaves entire or slightly serrate. Most of the species formerly known in gardens as *Witheringias* have been removed to *Solanum* (which *see*), but it is doubtful if any are now cultivated.

**WITHE ROD, AMERICAN.** *See Viburnum nudum.*

**WITHY.** *See Salix fragilis.*

**WITLOOF.** A variety of Chicory (*Cichorium Intybus*).

**WITSENIA** (named after Nicholas Witsen, a Dutch patron of botany). ORD. *Iridæ*. A monotypic genus. The species is an ornamental, greenhouse shrub. It thrives in sandy peat, and may be increased by divisions, or by seeds.

**W. corymbosa** (corymbose). \* *fl.* one (or two ?) to a spathe, subsessile; perianth purplish-blue, the tube elongated, cylindrical; lobes erect, connivent, the outer ones rather thick, tomentose at back, the inner ones shorter; stamens affixed to the throat, shorter than the perianth; spathes usually twin in the axils of the upper bracts. June. *l.* erect, ensiform, equitant, rather rigid; upper ones smaller, clustered. Stem tall, branched, compressed, acutely angled. South Africa, 1803. (B. 125; B. R. 5; F. d. S. 72; P. M. B. viii., p. 221.)

**WITTEBROOM.** *See Leucadendron.*

**WITTELSBACHIA.** A synonym of *Cochlospermum* (which *see*).

**WOAD, DYER'S.** *See Isatis tinctoria.*

**WOAD, WAXEN.** A common name for *Genista tinctoria* (which *see*).

**WOAD, WILD.** A common name for *Reseda Luteola* (which *see*).

**WOLF BERRY.** *See Symphoricarpos occidentalis.*

**WOLF CHOP.** A common name for *Mesembryanthemum lupinum* (which *see*).

**WOLF'S BANE.** *See Aconitum.*

**WOLF'S BANE, WINTER.** *See Eranthis hyemalis.*

**WOLF'S CLAW.** A common name for *Lycopodium clavatum* (which *see*).

**WOLF'S MILK.** *See Euphorbia.*

**WOLLASTONIA.** Included under *Wedelia* (which *see*).

**WOMAN'S-CAP ORCHID.** *See Thelymitra.*

**WONGA-WONGA VINE.** *See Tecoma australis.*

**WOOD.** The hard part of a stem, formed chiefly of woody tissue or pleurenychyma.

**WOOD ASHES.** The Ashes obtained from wood, after all the organic compounds have been destroyed by burning, form a very valuable manure, as they contain potash compounds, and also the other mineral substances that existed in the plants from which they were prepared. These Ashes usually contain the elements in forms that can be made use of by most plants in their nutrition. They are of especial value to the same species as yielded the wood from which they were prepared, since they possess all the mineral elements required by such plants, and, for the most part, in the desirable proportions. The Ashes that remain after weeds are burned may be employed like Wood Ashes, being similar in general composition; but it is usually better economy to make

**Wood Ashes**—*continued*.

up the weeds into a compost, and to employ them after slow decomposition with urine. Wood Ashes may be applied pure, or may be previously mixed with dung or other organic manures, *e.g.*, guano. They are sometimes made use of against insect depredations, either dusted without mixture on the plants, or mixed with powdered Pyrethrum leaves or Paris Green (Arsenate of Copper).

**WOOD BETONY.** *See Peduncularis canadensis* and *Stachys Betonica.*

**WOODBINE.** *See Lonicera Periclymenum.*

**WOODBINE, AMERICAN.** A common name for *Ampelopsis quinquefolia* (which *see*).

**WOOD-BORING BEES.** In many localities where there is a supply of decaying wood in which to form their burrows, these insects are not uncommon. Each female works independently of the others—not, as do Hive Bees and Humble Bees, in societies, for the good of the community. Each digs out a burrow for herself; forms one or more cells in it; stores her cells with pollen or other food suitable for the nourishment of her larvæ; lays an egg in the mass in each cell; closes up the mouth of the latter; and leaves the larva to escape from the egg, to live on the food stored up for it, and to pass through its development. At last the young Bees escape from the cells, and from the burrows when they are fully mature, to repeat the process for the benefit of their own offspring in turn. There are several kinds of Wood-boring Bees found in England, belonging to more than one genus. They show a considerable likeness to the common Hive Bee, so that they might be mistaken for the latter by a casual observer. Some of them burrow not only in decaying wood, but also in old walls, in the ground, or even in soft sandstone. The species of *Megachile* are called "Leaf-cutter Bees," as they cut pieces from the leaves of Roses, or other plants, and employ them in forming the cells for containing the larval food in the burrows. The end of each cell is closed by a set of circular pieces of leaf. Another Wood-borer has had one of its habits recorded by the well-known Rev. Gilbert White, of Selborne. This habit is that of stripping off the hairs from the surface of various plants, shaving the stems bare, as White says, "with all the dexterity of a hoop-shaver," and flying away with a bundle held between its chin and fore legs, almost as large as itself. With the hairs the female collects in this way she forms cells by uniting them with some sticky cement into a substance like felt. The cells are made in burrows dug out of the rotten wood of decaying Willows. This Bee's scientific name is *Anthidium manicatum*.

**WOOD - BRONEY.** An old name for the Ash (*Fraxinus*).

**WOOD FERN.** *See Polypodium vulgare.*

**WOODFORDIA** (named after J. Woodford, who wrote an account of the plants round Edinburgh in 1824). ORD. *Lythraceæ*. A monotypic genus. The species is a stove shrub, with long, spreading branches. For culture, *see Leianthus*.

**W. floribunda** (bundle-flowered). *fl.* scarlet, in short, panicked cymes on axillary peduncles, rarely solitary; calyx 3in. to 4in. long, six-toothed; petals six, scarcely longer than the calyx, or wanting. May and June. *l.* 2in. to 4in. long, opposite or nearly so, entire, lanceolate, usually rounded or cordate at base, often grey-pubescent beneath. *h.* 1ft. to 4ft. India, &c. SYNS. *W. tomentosa* (B. F. S. xiv.), *Grislea tomentosa* (B. M. 1906).

**W. tomentosa** (tomentose). A synonym of *W. floribunda*.

**WOOD LEOPARD MOTH.** *See Zeugera æsculi.*

**WOOD LILY.** A common name for *Pyrola minor* and various species of *Trillium*.

**WOOD NUT.** A popular name for *Corylus Avellana* (which see).

**WOOD OR SPURGE LAUREL.** See *Daphne Laureola*.

**WOODRUFF, or WOODROWEL.** A common name for several species of *Asperula*.

**WOODSIA** (named in honour of Joseph Woods, 1776-1864, author of "The Tourists' Flora"). Including *Hymenocystis* and *Physematum*. ORD. *Filices*. A genus comprising about fourteen species of small, much-tufted, stove, greenhouse, or hardy Ferns, mostly inhabiting cold or temperate climates. Stipes often jointed and separating at the joint. Sori globose; involucre inferior, soft-membranous, from the first calyciform or more or less globose, and sometimes inclosing the sorus, at length opening at the top, the margin or mouth irregular, lobed or fringed. The best-known species are here described. With the exception of *W. mollis*, all the exotic species thrive in a cool house. For general culture, see **Ferns**.

**W. alpina** (alpine). A garden name for *W. hyperborea*.

**W. Brownii** (Brown's). A synonym of *Hypoderris Brownii*.

**W. caucasica** (Caucasian). *fronds* lanceolate, 9in. long, glandular-hirsute on the rachis and midrib, firm-membranous, bipinnate; primary pinnae sessile, nearly opposite, lanceolate, broadest at the base, acuminate-pinnatifid or again pinnate; lobes or ultimate pinnules oblong, acute, serrated. *sori* large, two on each lobe or pinnule, one on each side near the margin; involucre globose. Caucasus. SYN. *Hymenocystis caucasica*.

**W. glabella** (nearly glabrous). *sti.* short. *fr.* linear, slightly tapering below, pinnate; pinnae very remote towards the short stipes, all deltoid, very obtuse, cut into from three to seven shortly rounded or sub-cuneate, entire lobes. North America. Norway, 1827. Baker regards this as possibly a glabrous form of *W. hyperborea*. (H. F. B. A. ii. 237.)



FIG. 225. WOODSIA HYPERBOREA.

**W. hyperborea** (extreme-northern). *rootstock* stout, somewhat elongated. *sti.* shining, clothed with ferruginous scales. *fronds* 3in. to 6in. long, linear-lanceolate, densely tufted; pinnae somewhat distant, ovate-cordate, ½in. to ½in. long, pubescent and ciliated, with a few broad lobes. *sori* three to five on each lobe. Arctic Europe (Britain), &c. See Fig. 225. SYN. *W. alpina* (of gardens). (Sy. Kn. B. 1863.)

**W. ilvensis** (Elba). *fronds* broadly lanceolate; pinnae oblong, obtuse, broader at the base, sessile, deeply pinnatifid, with many oblong, sub-crenate lobes. Alpine regions of Northern hemisphere. See Fig. 226. (Sy. Kn. B. 1862.) Iva, whence *ilvensis* is derived, is the classical name for the island of Elba. The species received the name because Linnaeus believed this Fern

**Woodsia—continued.**

to be the same as one figured by Dalechamp, named *Lonchitis aspera ilvensis*.



FIG. 226. WOODSIA ILVENSIS.

**W. mollis** (soft).\* *fronds* lanceolate, pinnate, generally densely clothed, especially beneath, with short, jointed hairs, scarcely attenuated below; pinnae sessile from a broader base, oblong, obtuse, pinnatifid; lobes approximate, oval or nearly round, entire or crenate. *sori* marginal; involucre opening with a jagged, circular mouth. Mexico, Guatemala, &c. Greenhouse. SYN. *Physematum mollis*.

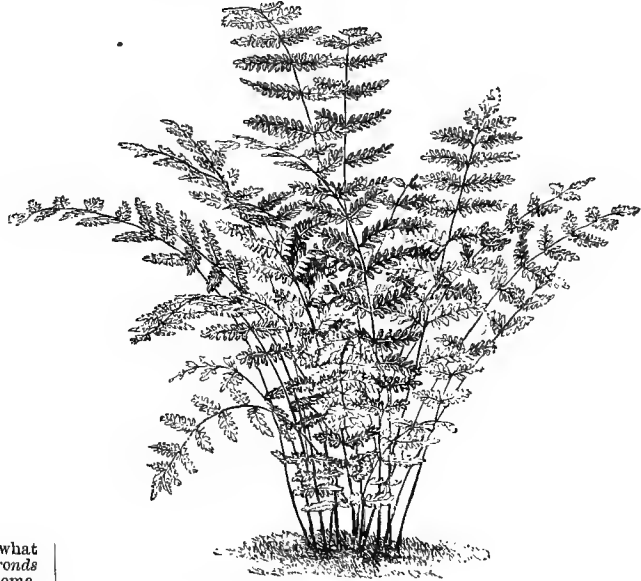


FIG. 227. WOODSIA OBTUSA.

**W. obtusa** (obtuse).\* *sti.* tufted, not articulated, 3in. to 6in. long, castaneous towards the base. *fronds* oblong-lanceolate, narrowed to both ends, 6in. to 9in. long, bipinnate or tripinnatifid; central pinnae sessile, lanceolate-deltoid, ½in. to 1½in. long, the lower ones reduced; pinnules oblong, blunt, crenulate, or the lowest sub-pinnatifid, glandular-pilose. *sori* sub-marginal,

**Woodsia**—continued.

six to twelve to the largest pinnules; involucre a small, membranous, lacerated, white cup. United States to Peru. See Fig. 227. (H. G. F. 43.) SYN. *W. Perriniana*.

**W. oregana** (Oregon). *sti.* densely tufted, not articulated, castaneous, 2in. to 4in. long. *fronds* oblong-lanceolate, narrowed to both ends, 3in. to 4in. long, bipinnate, glabrous; pinnae lanceolate, sessile, the central ones  $\frac{1}{2}$ in. to  $\frac{3}{4}$ in. long, cut down to the rachis or a narrow wing into blunt, oblong, crenate lobes, the lower ones distant, gradually reduced; rachis stramineous. *sori* sub-marginal; involucre hidden by the sorus. North America. Closely allied to *W. obtusa*.

**W. Perriniana** (Perrin's). A synonym of *W. obtusa*.

**W. polystichoides** (Polystichum-like).\* *fronds* 9in. long, opaque, lanceolate, pinnate, sparsely subulate-squamulose; pinnae spreading, approximate, sessile, 6in. to 8in. long, lanceolate, acute, cuneate-truncate at base, acutely auricled at the superior base, entire or obsoletely crenate at the apex, indistinctly costate. *sori* marginal in a distinct line or series; involucre globose, of four or five ciliated, incurved scales. Japan, 1863.

**W. p. sinuata** (sinuate). *fronds*, pinnae broader, more obtuse, lobed-pinnatifid. (H. G. F. 32, f. 3.)

**W. p. Veitchii** (Veitch's). *fronds* very villous (H. G. F. 32, f. 1, 2, 4-6.)

**W. scopulina** (brush-like). *sti.* densely tufted, 2in. to 3in. long, castaneous below. *fronds* 4in. to 6in. long, oblong-lanceolate, bipinnate, narrowed from the middle to both ends; central pinnae lanceolate, sessile,  $\frac{1}{2}$ in. to  $\frac{3}{4}$ in. long, cut down to the rachis or a narrow wing into close, ligulate-oblong, crenate-pinnatifid lobes; upper surface slightly, lower densely, glandular-pilose, with a few minute scales on the ribs. Rocky Mountains, 1884. "Scarcely more than a variety of *S. obtusa*" (Baker).

**WOOD SORREL** (*Oxalis Acetosella*). A hardy, native perennial, occasionally cultivated for the use of its young leaves in salads. It should be cut over frequently, and not allowed to produce seed in gardens, or else the seedlings may become troublesome weeds. A cool, shady place is best suited, but the plant is seldom cultivated. If a few specimens are desired, they are best procured in spring and transplanted from places where they grow naturally.

**WOOD SOWER.** An old name for the common Wood Sorrel (*Oxalis Acetosella*).

**WOOD TIGER MOTH.** See Tiger Moths.

**WOOD-TONGUE FERN.** See *Drymoglossum*.

**WOOD VIOLET.** See *Viola sylvatica*.

**WOODWARDIA** (named after Thomas Jenkinson Woodward, an English botanist). Chain Fern. Including *Anchistea* and *Lorinseria*. ORD. *Filices*. A small genus (about half-a-dozen species) of highly decorative, greenhouse or half-hardy Ferns, belting the world in the North temperate zone, extending very slightly within the tropics. Fronds usually ample and bipinnatifid. Sori linear or linear-oblong, sunk in cavities of the frond, placed in single rows parallel with, and contiguous to, the midribs of the pinnae and pinnules; involucre sub-coriaceous, the same shape as the sorus, closing over the cavity like a lid. Woodwardias thrive in any well-drained, light, rich

**Woodwardia**—continued.

soil, and require plenty of water, both at the roots and overhead, during the summer months. They succeed well if planted out in the conservatory border, and grow much more vigorously than in pots. For general culture, see Ferns.

**W. angustifolia** (narrow-fronded). A synonym of *W. areolata*.

**W. areolata** (areolate).\* *barren fronds* 9in. to 12in. long, 6in. to 8in. broad, on a slender stipes, deltoid-ovate, with numerous oblong-lanceolate, situated pinnae on each side, the lower ones 3in. to 4in. long,  $\frac{1}{2}$ in. to  $\frac{3}{4}$ in. broad, reaching down to the rachis, which above has a broad wing; both surfaces naked. *fertile fronds* on an elongated, strong, erect, chestnut-brown, naked stem; pinnae 3in. to 4in. long, narrow-linear,  $\frac{1}{2}$ in. to 1in. apart. United States, 1812. See Fig. 228. (H. G. F. 61.) SYN. *W. angustifolia*.

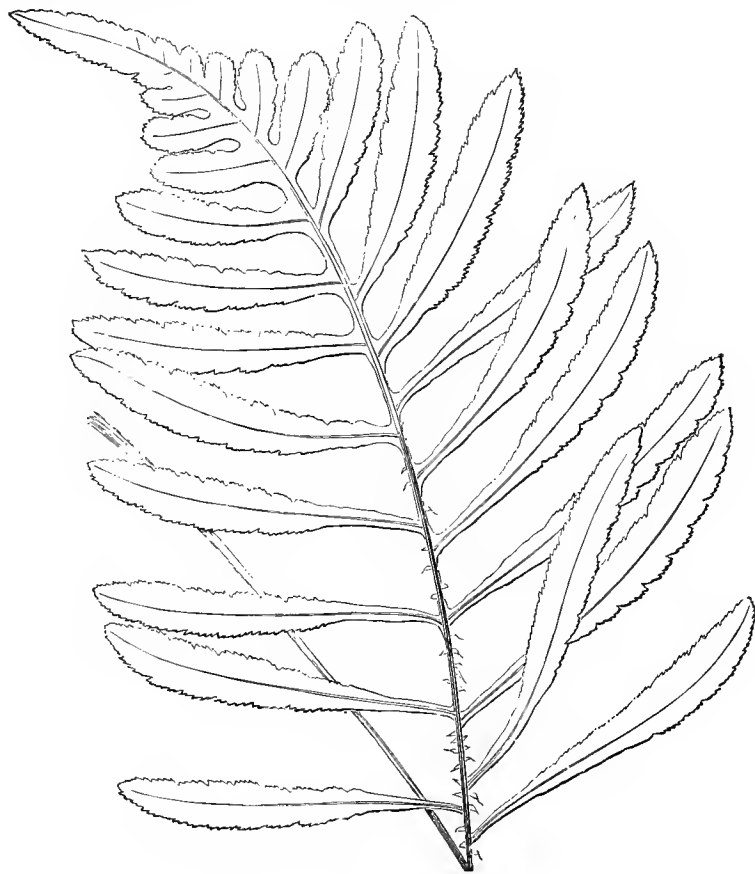


FIG. 228. BARREN FROND OF WOODWARDIA AREOLATA.

**W. Harlandii** (Harland's). *sti.* 6in. to 18in. long, erect, nearly naked. *barren fronds* varying in shape from linear-lanceolate, undivided, to broadly ovate, with one or two spreading, linear-lanceolate lobes, 3in. to 4in. long,  $\frac{1}{2}$ in. to  $\frac{3}{4}$ in. broad, reaching down to a broadly-winged rachis; both surfaces naked. *fertile fronds* with more numerous and narrower lobes, the lowest pair often quite free of the others. *sori* in broad lines close to the midrib of the lobes, with short lines branching from these in an erecto-patent direction. Hong Kong.

**W. japonica** (Japanese). *sti.* 6in. to 12in. long, erect, scaly below. *fronds* broadly ovate, 1ft. to 1½ft. long, 9in. to 12in. broad; pinnae lanceolate, often 6in. long, 1in. to 1½in. broad, reaching half or two-thirds of the way down to the rachis, the lines of sori which margin the midrib of the pinnae confined to the upper part of the upper ones. China and Japan.

**W. orientalis** (Eastern). *sti.* erect, densely scaly at base. *fronds* 4ft. to 8ft. long, 1ft. to 1½ft. broad; pinnae lanceolate, sometimes more than 1ft. long, cut down below nearly to the

**Woodwardia**—*continued*.

rachis into sinuated or pinnatifid pinnales, sometimes 4 in. long, those of the under side shorter, and none at the base of the pinnae; veins copiously anastomosing outside the sori; upper surface often producing copious, gemmiferous buds. Japan to Formosa. Closely allied to *W. radicans*.

**W. radicans** (rooting).\* *sti.* strong, erect, naked, scaly at base. *fronds* 3 ft. to 6 ft. long, 1 ft. to 1½ ft. broad; pinnae lanceolate, the lower ones often 1 ft. long, cut down below within a short distance of the rachis into finely-toothed, lanceolate pinnules lin. to 1½ in. long, those of the under side the shortest; veins anastomosing once outside the line of fruit; gemmae few and large, placed at the base of the upper pinnae. Canaries, South Europe, &c., 1779.

**W. r. cristata** (crested).\* A handsome variety, with regularly and symmetrically crested pinnae. 1878.



FIG. 229. PINNA OF FERTILE FROND OF WOODWARDIA VIRGINICA.

**W. virginica** (Virginian). *sti.* strong, erect, 1 ft. to 1½ ft. long. *fronds* oblong-lanceolate, 1 ft. to 1½ ft. long, 6 in. to 9 in. broad; pinnae linear-lanceolate, 4 in. to 6 in. long, ¾ in. to 1 in. broad, cut down within one line or less of the rachis into linear-oblong lobes, which are two to three lines broad at the base, the lines of sori which margin the midrib of the pinnae often reaching low down in the lower ones. Canada, southward, 1774. See Fig. 229.

**WOOD, WAXEN.** A common name for *Genista tinctoria* (which see).

**WOODY NIGHTSHADE.** See *Solanum Dulcamara*.

**WOOLLEN.** An old name for Mullein (*Verbascum*).

**WOOLLEN RAGS.** Occasionally, these are used as manure. They should be torn or cut up into shreds, and dug into the soil. There they decay slowly, and decompose into substances useful to plants, ammonia being formed, among other products. Owing to their slow decay, their effects are perceived for two or three years. Their action as manure is hastened by steeping them for some months in Sulphuric Acid or Oil of Vitriol; but their fertilising influence ceases more quickly after

**Woollen Rags**—*continued*.

this treatment. Woollen refuse and rags are made great use of in Kent as manure for Hops, after having been made up for some time in a compost.

**WOOLLY APHIS** (*Schizoneura lanigera*). An insect more often called the **American Blight** (which see). A few particulars may be added to the account already given of this very dangerous pest to Apple-trees. The wingless females are oval and flattened, with deep constrictions between the body-rings. In general appearance they much resemble blackish-brown Aphides; but the antennae and limbs are very short, the tail is very small, and the two honey-tubes are extremely small. These wingless females live on the bark, sucking its juices, and produce multitudes of living larvae, like themselves on a smaller scale. In autumn, winged viviparous females also are found, differing from the wingless females in little but the possession of wings. The winged females produce small, ill-developed insects, of which each gives birth to one egg for the continuance of the species during winter. The larvae seem to suffer very little from the action of low temperatures, as they are protected under the cottony excretions with which they cover themselves. It is said that in winter they fix themselves on the roots of Apple-trees, and suck the sap from them, returning to the branches in spring. The pupae are like the winged females, except in having the wings represented only by little scales. The males are small, and, like the winged females, are unable to suck, as the beak is undeveloped.

The popular name (American Blight) points to the belief that this insect has been imported from America into Europe. The earliest European record of its occurrence dates from 1787. In England, it was first observed in a nursery, near London, in which were Apple-trees recently imported from North America. It soon spread, with disastrous results, into the orchards of Devonshire. In Germany it was first observed in 1801, in France and Belgium in 1812. It is now plentiful in many parts of Europe. It feeds on the wild Crab Apple of North America; but several leading American entomologists believe that it has been carried from Europe to America, and not in the reverse direction, as generally supposed.

**Remedies.** A number of the more highly recommended remedies are mentioned under **American Blight**. The most important point to attend to is the thorough cleansing of the branches, by the aid of a thick brush and any good insecticide, e.g., soft soap in water, alone or mixed with crude carbolic acid of such a strength that the acid does not separate as oily drops when the soap is mixed with water. Usually, about one part of acid to ten of soap is sufficient, thoroughly mixed before water is added. The solution may be used moderately strong to the older branches, weaker to the younger ones. Kerosene may be used instead of the above—Professor Comstock states that he has sprayed it pure on plants, without injury to them—but it is usually employed diluted with four or five times its bulk of water; in this strength it may be applied to the branches without risk of injury. Another useful remedy is employed thus: Towards the end of autumn, or in winter when the weather is mild, the earth for about 3 ft. from the tree is thrown back from the old roots, and one or two pailfuls of lime-water, or of lye of wood ashes, is poured in; then about 1 in. of newly-slaked lime is scattered in, and the earth is replaced. All small branches on which the insect is established should be cut off and burned.

**WORM GRASS.** See *Spigelia marilandica*.

**WORMIA** (named in honour of Olaus Wormius, a famous Danish philosopher and naturalist). SYN. *Lenidia*. ORD. *Dilleniaceae*. A genus comprising nine species of stove trees; one is found in the Mascarene Islands, another is Australian, and the rest inhabit tropical Asia. Flowers showy, disposed in terminal, often few-flowered panicles;

**Wormia**—*continued*.

sepals five, spreading; petals five; stamens nearly free. Leaves ample, parallel-penniveined. Only two species have been introduced. They thrive in a light, sandy loam. Cuttings of half-ripened wood root readily, if inserted in sand, under a glass, in bottom heat.

**W. Burbidgei** (Burbidge's).\* *fl.* pale golden-yellow. 3in. in diameter, sub-cymose on a simple peduncle 2in. to 4in. long; petals obovate-oblong, with broadly undulated margins; stamens almost white. July. *l.* 8in. to 10in. long, almost exactly elliptic, the base contracted and decurrent as a very broad petiole, 1in. to 1½in. long, which expands and is amplexicaul at base. Branches terete. North Borneo. (B. M. 6531.)

**W. dentata** (toothed). A synonym of *W. triquetra*.

**W. triquetra** (triquetrous). *fl.* white, 2in. in diameter, in sub-terminal, leaf-opposed, secund, few-flowered racemes; pedicels 1in. long, thickened upwards. May. *l.* broadly oval, 5in. to 8in. long, repand-toothed or sinuated, the tip obtuse or sub-truncate, the base rounded; petioles with broad, sheathing, deciduous wings. *h.* 20ft. Ceylon, 1818. *SYN.* *W. dentata*.

**WORMS.** Under this name will be discussed only the Earth Worms, since the Nematoid Worms have been already treated of. The Earth Worms all belong to the genus *Lumbricus*; but many species have been named and described. Their general appearance is too well known to call for description. They possess two rows of bristles along the sides of the body, so short as to be almost invisible, but stiff, and adapted for enabling the Worms to move by their aid; they can be felt on drawing a finger along the sides of the body from behind forwards. On damp evenings and nights the Worms stretch out of their holes to seize on food, and to drag it into their burrows. The trembling of the soil due to footsteps, or the approach of a light, causes a very rapid retreat into their holes. In winter, and in very dry weather, they burrow deep into the soil, beyond the reach of cold and droughts. They feed on decaying vegetable substances, and swallow much earth to obtain such remains of plants as are in it. The earth, after the vegetable matter is digested by the Worm, is ejected close to the opening of the burrow in the form known to all gardeners as "worm-castings."

In most cases, Worms ought to be regarded as useful creatures, since they constantly renew the surface soil with finely-divided earth brought from the subsoil, and, by means of their burrows, allow the free penetration of rain and air to greater depths than would otherwise be reached. They also promote the more rapid decay of the vegetable remains in the soil. But, on the other hand, they are obnoxious on lawns and in flower borders, because of the untidy appearance of their castings, and of the pieces of leaves, paper, and other things dragged partially into their burrows. They also disfigure plants by dragging in the ends of living leaves. When they get into flower-pots, they are troublesome or hurtful, and should be ejected.

**Remedies.** After or during mild, warm showers in the dusk of evening, Worms crawl out in large numbers from their holes in search of food, and can be collected by the aid of a lantern; but the operation must be quickly performed, for the reason above stated. Watering the soil—whether in a flower-pot, lawn, or flower border—with a weak solution of smelling salts or Carbonate of Ammonia causes the Worms to come to the surface in a nearly helpless state; and an infusion prepared from Walnut leaves has the same effect. This should be done in the evening. An undue increase in their numbers may be checked by keeping in gardens such creatures as hedgehogs, shrew-mice, frogs, and the *Testacella* slugs, which feed largely on Worms.

**WORMWOOD** (*Artemisia Absinthium*). A hardy perennial, grown for the use of its leaves and tops medicinally; they are intensely bitter. The plants prefer a somewhat sheltered, rather dry position; very few specimens are generally sufficient. Propagated by seeds, cuttings, and division of the roots, in spring.

**WOUNDS.** These are often caused in fruit and other trees by an improper use of a knife or hammer, also by friction, *e.g.*, when two branches rub against each other, and in many other ways. Wounds are invariably longer in getting callused and grown over than clean cuts; hence care should specially be taken to prevent any being made in the bark of trees, &c., for want of proper attention or appliances.

**WOUNDWORT.** See *Anthyllis Vulneraria* and *Stachys*.

**WOUNDWORT, HERCULES'.** A common name for *Heracleum* (which see).

**WREATH.** A floral head-dress which goes all round the head. It is generally made up of choice flowers of rather small or medium size. Another kind of Wreath is that made, in various sizes, of fresh or dried flowers, for funerals, &c. The outline is circular; and a framework upon which to fasten the flowers may easily be made with a piece of strong wire, or of thin board or cardboard, cut into the size and shape desired. Either green moss or sprigs of Myrtle or Box may be bound round to cover the frame before the flowers are arranged.

**WREATHWORT, PURPLE.** A common name for *Orchis mascula* (which see).

**WREATH, PURPLE.** See *Petræa volubilis*.

**WRIGHTIA** (named after William Wright, 1740-1827, a Scotch physician and botanist). Palay or Ivory-tree. *SYN.* *Balfourea*. *ORD.* *Apocynaceæ*. A genus including about a dozen species of stove shrubs or small trees, with often slender, cord-like branches, natives of tropical Africa, Asia, and Australia. Flowers red, white, or yellow, in terminal or sub-axillary, sessile cymes; calyx short, five-parted, with glands or scales inside; corolla salver-shaped, the tube cylindric, usually short, the throat with one or two series of usually fimbriated scales; stamens at the top of the tube; filaments short, dilated. Leaves opposite, penniveined. The best-known species are here described. They thrive in a mixture of peat, loam, and sand. Cuttings root readily if inserted in sand, in heat.

**W. coccinea** (scarlet).\* *fl.* dark red, 1in. in diameter; corolla thick, almost fleshy; scales crimson; cymes three or four-flowered. July. *l.* elliptic or elliptic-lanceolate, 3in. to 5in. long, membranous, obtusely caudate-acuminate, acute at base; petioles very short. *h.* 12ft. and upwards. India, 1822. A glabrous or pubescent tree. (B. M. 2696.) *SYN.* *Nerium coccineum* (L. B. C. 894).

**W. dubia** (doubtful). *fl.*, corolla lobes yellow outside, orange-red within, ten lines long, spreading, acuminate; pedicels rather shorter than the flowers; cymes three-flowered, glabrous. June. *l.* ovate-lanceolate, 3in. to 4in. long, glabrous, slightly undulated, rather obtusely acuminate. Native country uncertain, 1813. Shrub. *SYN.* *Cameraria dubia* (B. M. 1646).

**W. pubescens** (downy). *fl.* white, sessile or shortly pedicellate; cymes terminal, trichotomous, corymbose, not exceeding the leaves; corolla tube scarcely exceeding the calyx, the lobes twice as long. March. *l.* shortly petiolate, ovate to elliptic-oblong, acuminate, 2in. to 4in. long. North Australia, 1829. A pubescent or velvety-tomentose, tall shrub or small tree.

**W. tinctoria** (dyers'). Pala Indigo-plant. *fl.* white, ½in. to ¾in. in diameter; cymes sometimes ½in. in diameter, with slender, spreading, dichotomous branches. Summer. *l.* elliptic-ovate, elliptic-lanceolate, or obovate-oblong, 3in. to 5in. long, obtusely acuminate or caudate, acute or rounded at base; petioles very short. India, 1812. A small, glabrous tree. (B. F. S. 241; B. R. 935.)

**WRIGHTIA** (of Roxburgh). A synonym of *Wallichia* (which see).

**WULFENIA** (named in honour of Francis Xavier Wulfen, 1778-1825, a botanical author). *ORD.* *Scrophularinæ*. A small genus (four species) of hardy, glabrous or scarcely pilose, perennial herbs, with a thick rhizome, natives of Carinthia, Western Asia, and the Himalayas. Flowers blue, ebracteolate, nodding, solitary in the axils of the bracts, racemose or spicate at the tops of the scapes; calyx five-parted; corolla tube exserted, cylindrical; limb of four erecto-patent, imbricated lobes, the

**Wulfenia**—continued.

upper one emarginate or bifid, the lower one entire or crenate; stamens two; peduncles scape-like, simple, with a few alternate scales. Leaves sub-radical, petiolate, crenate. The two introduced species are well adapted for the rockery, or for ornamenting well-drained but moist flower borders, being very showy when in blossom. Any light, rich soil is suitable; the protection of a frame in winter is desirable, as the plants are liable to rot if left in the open air at that season. Propagation may be effected by divisions, or by seeds.

**W. Amherstiana** (Amherst's). *fl.* horizontal; corolla  $\frac{1}{2}$  in. long, with lanceolate, acute lobes; pedicels shorter than the calyx; racemes long, slender, very many-flowered; scapes 5 in. to 10 in. long, slender. July. *l.* obovate-oblong or obovate-spathulate, 2 in. to 5 in. long, coarsely crenate or lobulate, narrowed at base and sub-pinnatifid; petioles  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long. Himalayas, 1846.

**W. carinthiaca** (Carinthian).\* *fl.*, corolla tube  $\frac{1}{2}$  in. long, the limb shorter, the upper segments bifid, the lower sub-crenate; pedicels much shorter than the calyx; raceme dense, spike-like, at length elongated; scape 1 ft. to 2 ft. long, scaly below. July. *l.* oblong or oboval-oblong, doubly-crenate, slightly lobed, narrowed at base; radical ones few,  $\frac{3}{4}$  in. to 8 in. long. Carinthian Alps, 1817. (B. M. 2500; S. B. F. G. 66.)

**WULFIA** (named in honour of John C. Wulff, who died in 1767, author of "Flora Borussica"). **SYNS.** *Chakiatella*, *Chylodia*, *Tilesia*. **ORD.** *Compositæ*. A small genus (eight species have been described, but all are not distinct as such) of tropical American, stove, scabrous-pubescent, perennial herbs. Flower-heads yellow, at first depressed, at length globose, pedunculate, solitary or three to seven in a corymb; involucre hemispherical, with two or three series of bracts; receptacle slightly convex, the pales enveloping the florets; ray florets, when present, entire or minutely toothed; achenes glabrous or slightly pilose. Leaves opposite, petiolate, crenate-serrated. *W. maculata*, the only species introduced, is of easy culture in any light soil. Propagation may be effected by seeds, or by divisions.

**W. maculata** (spotted). *fl.*-heads orange-yellow; ray florets about eight, twice as long as the involucre; peduncles ternate, terminal. June. *l.* oblong-lanceolate, cuneate at base, acuminate at apex, serrated, scabrous above, nearly glabrous beneath. Stem erect, tetragonal, spotted. *h.* 3 ft. Brazil, 1822. **SYN.** *Gymnolonia maculatum* (B. R. 662).

**WULLSCHLEGELIA** (named after Herr Bischoff Wullschlagel, who collected *W. aphylla* in Jamaica). **ORD.** *Orchidæ*. A small genus (two species) of stove, terrestrial, leafless Orchids, found in the West Indies and Brazil. Flowers very small, in loose, sub-sessile spikes; lip sessile at the base of the column, erect, concave, the base produced in a pouch or spur. Stems simple, with a few small scales. The species are of no horticultural value.

**WURMBEA** (named in honour of F. van Wurmb, Secretary to the Academy of Sciences at Batavia). **ORD.** *Liliacæ*. A genus consisting of seven species of greenhouse plants, with tunicated bulbe or corms, natives of South Africa and Australia. Flowers ebracteate, subsessile, in a short, terminal, pedunculate spike; perianth sub-campanulate or expanded nearly from the base, persistent, the lobes longer than the tube, sub-equal, spreading; stamens six. Leaves few, linear or rarely ovate-lanceolate, continuous with the sheaths. *P. campanulata* and its varieties, the only plants calling for description here, are pretty subjects when in flower. They thrive in a compost of sandy peat and a little loam. Propagation may be easily effected by seeds, or by offsets.

**W. campanulata** (bell-shaped). *fl.*, perianth pallid,  $\frac{1}{4}$  in. to  $\frac{1}{2}$  in. long, the tube campanulate, the segments lanceolate, acute, black-glandular above the base; spikes 1 in. to  $\frac{3}{4}$  in. long, loose or dense-flowered. May and June. *l.* three or four, firm; lower ones linear,  $\frac{3}{4}$  in. to 9 in. long; upper ones lanceolate, dilated at base, embracing the stem. Bulb ovoid; tunic brown. *h.* 6 in. to 12 in. South Africa, 1819. **SYN.** *Melanthium nonopetulum* (B. M. 1291). *W. purpurea* (A. B. R. 221; B. M. 694) is regarded, by Baker, as a form of this species; it has a lurid-purple perianth, the segments equalling or exceeding the campanulate tube.

**Wurmbea**—continued.

**W. c. longiflora** (long-flowered). *fl.*, perianth pale,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long, the segments equalling or shorter than the cylindrical tube. 1788. A robust variety. *W. pumila* is a dwarf form of this, with three or four flowers in a spike, and linear leaves.

**W. pumila** (dwarf). A form of *W. campanulata longiflora*.

**W. purpurea** (purple). A form of *W. campanulata*.

**WÜRTHIA**. A synonym of *Ixia* (which see).

**WYCH ELM.** See *Ulmus glabra* and *U. montana*.

**WYETHIA** (so called after N. B. Wyeth, the discoverer of this genus in the mountains of North America). **SYN.** *Alarconia*, *Melarrhiza*. **ORD.** *Compositæ*. A genus of seven species of hardy, perennial, North American herbs, with a thick caudex. Flower-heads yellow, large, heterogamous, radiate; involucre hemispherical, the bracts in two or three series, scarcely unequal; receptacle flat or slightly convex; ray florets ligulate, spreading; disk florets shortly five-cleft at apex; achenes glabrous. Leaves radical or alternate, entire. Stem often simple and one-headed. Only one species calls for mention here. For culture, see *Helianthus*.

**W. angustifolia** (narrow-leaved). *fl.*-heads yellow, solitary; scales of involucre mostly foliaceous, lanceolate or broader, equalling the disk; involucre fully 1 in. high, loose or spreading; rays numerous,  $\frac{1}{2}$  in. long. Autumn. *l.* radical ones stalked, elongated-lanceolate, tapering to both ends, occasionally dentate or serrate, often undulate; cauline ones sessile, broader. *h.* 6 in. to 2 ft. United States.

**WY MOT.** An old name for Marsh Mallow (*Althæa*).

**XANTHISMA** (from *xanthisma*, yellowness; alluding to the colour of the flowers). **SYN.** *Centauridium*. **ORD.** *Compositæ*. A monotypic genus. The species is a hardy, annual or biennial herb. Seeds should be sown in the open border, during April.

**X. texanum** (Texan). *fl.*-heads wholly yellow, heterogamous, mediocre, solitary, at the tips of the branches; involucre broadly campanulate, or at length sub-globose, the imbricated bracts in several series; receptacle flat, strongly fimbriiferous; achenes glabrous; pappus reddish, shining. Summer. *l.* alternate, linear-lanceolate, entire, pale, erect, sessile, about 1 in. long. *h.* 1 ft. to 2 ft. Texas, 1877. (B. M. 6275.)

**XANTHIUM** (the old Greek name used by Dioscorides, from *xanthos*, yellow; the plants were formerly used by the Greeks for dyeing hair). Cockle Bur; Clot Bur. **ORD.** *Compositæ*. A genus consisting of about four species of hardy, annual herbs, dispersed over warm and temperate regions. Flower-heads solitary or glomerate at the axils, unisexual. Leaves alternate, lobed or toothed. The species are of no horticultural value. *X. spinosum* (Bathurst Bur; Spiny Clot-Bur) and *X. strumarium* (Ditch or Louse Bur; Small Burdock) are casual weeds in Britain.

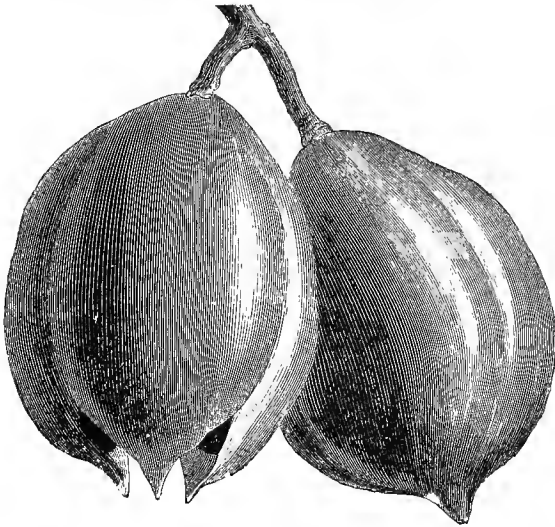
**XANTHOCEPHALUM** (from *xanthos*, yellow, and *cephale*, a head; alluding to the yellow flower-heads). **SYN.** *Xanthocoma*. **ORD.** *Compositæ*. A genus consisting of eight species of greenhouse or hardy herbs or sub-shrubs; one is found in Ecuador, and the rest are Mexican. Flower-heads wholly yellow, rather large or mediocre, solitary or loosely corymbose at the tips of the branches, heterogamous; involucre hemispherical or broadly campanulate, the imbricated bracts in several series; receptacle flat, foveolate; ray florets ligulate, spreading, nearly entire; disk florets five-cleft at apex; achenes glabrous. Leaves alternate, narrow, entire or toothed. Only two species call for mention here. Both thrive in any fairly good soil. *X. centauroides* may be increased by cuttings, and *X. gymnospermoides* by divisions.

**X. centauroides** (Centaurea-like). *fl.*-heads yellow, solitary involucre clammy; outer scales spreading. July to September. *l.* sessile, thickish, linear, pinnatifidly toothed, wrinkled, glabrous. *h.* 1 ft. Mexico, 1826. Greenhouse sub-shrub. **SYN.** *Grindelia coronopifolia*.



**Xanthocephalum**—continued.FIG. 230. INFLORESCENCE OF *XANTHOCEPHALUM GYMNOSPERMOIDES*.

**X. gymnospermoides** (Gymnosperma-like).\* *fl.* heads orange-yellow, about lin. in diameter, corymbose. September. *l.* 3in. to 6in. long, lanceolate, linear, and small above, the lower ones sub-spathulate and serrated towards the point, the rest entire. *h.* 2ft. to 4ft. New Mexico, 1859. Hardy perennial. See Fig. 230. *SYN.* *Gutierrezia gymnospermoides* (B. M. 5155).

FIG. 231. FRUITS OF *XANTHOCERAS SORBIFOLIA*.

**XANTHOCERAS** (from *xanthos*, yellow, and *keras*, a horn; alluding to the yellow, horn-like glands or nectaries between the petals). *ORD.* *Sapindaceæ*. A monotypic genus. The species is a small, hardy tree, thriving in any light garden soil. It is difficult to propagate in any other way than from seeds; but root-cuttings sometimes succeed.

**X. sorbifolia** (Sorbus-leaved). *fl.* white, with blood-red streaks at the base, large, regular, polygamous; sepals five, equal, boat-shaped, imbricated; petals five, elongated, clawed, without scales; disk cup-like; stamens eight; pedicels long, bracteate at base; racemes simple, terminal. *fr.* three-celled, the size of an apple. *l.* alternate, exstipulate, imparipinnate; leaflets serrated. *h.* 5ft. to 15ft. China, 1870. See Fig. 231. (B. M. 6923; F. d. S. 1899; G. C. u. s. v., p. 555, and xxvi., p. 205; I. H. 1877, 295; R. H. 1872, p. 291.)

FIG. 232. *XANTHOCHYMUS PICTORIUS*.

**XANTHOCHYMUS** (from *xanthos*, yellow, and *chymos*, juice; the plants contain an abundance of yellow juice). *SYN.* *Stalagmites*. *ORD.* *Guttiferae*. A small genus (four species) of stove trees, with the habit of *Garcinia* (under which *Xanthochymus* is included by Sir J. D. Hooker, in his "Flora of British India"), inhabiting tropical Asia and Africa, and Madagascar. Sepals and petals five, very rarely four; filaments connate in five, rarely four, erect, distant, pedicellate, spathulate bodies. Berry indehiscent. Three of the species have been introduced. They thrive in a compost of loam and

**Xanthochymus**—continued.

peat; and may be propagated by cuttings of ripened shoots, inserted in sand, under a glass, in strong bottom heat.

**X. dulcis** (sweet-fruited). *fl.* cream-white, in fascicles; petals conniving in a globular form; peduncles scarcely longer than the flowers. February. *fr.* bright yellow, smooth, the size of an apple, with copious yellow pulp, palatable and good. *l.* opposite, 6in. or more long, oblong, acuminate, coriaceous, entire, bright glossy green, paler beneath. *h.* 20ft. Molucca Islands, 1820. (B. M. 3088.)

**X. ovalifolius** (oval-leaved). *fl.* white,  $\frac{1}{2}$ in. to  $\frac{3}{4}$ in. in diameter, the males and females often mixed in one fascicle, but usually the females are fasciated and the males spiced. Summer. *fr.* deep green, the size of a walnut. *l.* sub-orbicular to lanceolate, obtuse,  $\frac{3}{4}$ in. to 8in. long. India. A middling-sized tree. SYN. *Garcinia ovalifolia*.

**X. pictorius** (painter's).\* *fl.* white; males  $\frac{1}{2}$ in. in diameter, in four to eight-flowered fascicles from the axils of fallen leaves; hermaphrodite ones like the males. Summer. *fr.* dark yellow, the size of an apple, globose, pointed. *l.* linear-oblong or oblong-lanceolate, 9in. to 18in. long, coriaceous, shining, reticulated. Trunk straight. *h.* 40ft. India. This tree yields a large quantity of indifferent gamboge. See Fig. 232. (B. F. S. 88; R. H. 1881, p. 13.) SYN. *Garcinia Xanthochymus*.

**XANTHOCOMA.** A synonym of **Xanthocephalum** (which see).

**XANTHOCROMYON.** A synonym of **Trimezia** (which see).

**XANTHORHIZA** (from *xanthos*, yellow, and *rhiza*, a root; alluding to the bright yellow colour of the long roots and rootstock). SYN. *Zanthorhiza*. ORD. *Ranunculaceæ*. A monotypic genus. The species is a hardy, dwarf shrub or under-shrub. It thrives in common garden soil, and may be increased by suckers.

**X. apiifolia** (Apium-leaved). *fl.* dark purple, small, often polygamous, in slender, compound racemes, appearing before (and under) the leaves; sepals five, petaloid; petals five, small, clawed, often dilated at apex. March and April. *l.* pinnate, long-petiolate; leaflets three to five, ovate and lanceolate-ovate, incisely lobed and toothed from near the acute base. Stems 2ft. to 3ft. high. North America, 1766. (B. M. 1736; B. M. Pl. 9.)

**XANTHORRHOEA** (from *xanthos*, yellow, and *rheo*, to flow; referring to the resinous juice extracted from the plants). Black Boy; Grass Gum-tree; Grass-tree. ORD. *Juncaceæ*. A genus embracing eleven species of greenhouse, long-lived perennials, with a thick, woody caudex, all natives of Australia. Perianth persistent, of six distinct segments; stamens six; scape or peduncle terminal, hard, often several feet long, terminating in a dense, cylindrical spike of numerous sub-sessile flowers, closely packed with numerous bracteoles surrounding each flower within a small or subulate, subtending bract. Leaves in a dense tuft at the top of the caudex, long-linear, brittle, spreading or recurved, their broader, closely imbricated bases remaining long persistent. Caudex of several species emitting a copious, dark or yellow, resinous gum (the former kind called Black-boy Gum, and the latter Botany Bay or Acaroid Resin). Some of these plants form conspicuous features in Australian landscapes. Those best known to cultivation are here described; all have white flowers, appearing in spring. They thrive in a compost of peat and loam, and may be increased by offsets.

**X. arhorea** (tree-like). Botany Bay Gum. *fl.*, perianth segments about  $\frac{1}{2}$ in. long, three-nerved; spike 3ft. to 4ft. long,  $\frac{1}{2}$ in. to 1in. in diameter; scape 5ft. to 6ft. long. April. *l.* flat or triquetrous, 3ft. to 4ft. long, two or three lines broad. Caudex attaining several feet in height, with a diameter of 6in. to 9in.

**X. australis** (Southern). *fl.*, spike, when full grown, upwards of 2ft. long, nearly  $\frac{1}{2}$ in. in diameter; scape usually about 2ft. high. Summer. *l.* about 2ft. long, one line or rather more broad, somewhat flat, but with the dorsal angle, and sometimes also the facial one, prominent. Caudex elongated, but rarely exceeding 2ft. in height. 1824.

**X. bracteata** (conspicuous-bracted). *fl.*, spike usually  $\frac{1}{2}$ in. to 6in. long,  $\frac{1}{2}$ in. or sometimes  $\frac{3}{4}$ in. in diameter; subtending bracts subulate and very conspicuous in the young spike; scape 2ft.

**Xanthorrhœa**—continued.

to 3ft. high. Summer. *l.* about 2ft. long, one line or rather more broad, concave above, the dorsal angle slightly projecting in the lower part, tapering upwards into a narrow, triquetrous point. Caudex very short. 1810.

**X. hastilis** (spear-like). *fl.*, spike 1ft. to 2ft. long, a dense, rusty tomentum covering the ends of the bracts and outer perianth segments; scape often 6ft. to 8ft. long below the spike. *l.* 3ft. to 4ft. long, two to three lines broad, flat in front, but with the dorsal angle more or less prominent. Caudex very short, or often scarcely prominent. 1803. (B. M. 4722; F. d. S. 868.)

**X. minor** (lesser). *fl.*, spike 3in. to 6in., rarely 7in. or even 8in., long, seven to eight lines in diameter when fully out; scape, when full grown, often longer than the leaves. *l.* crowded on the caudex. 1ft. to 2ft. long, one to nearly two lines broad, flat but thick, or more or less triquetrous. Caudex short and thick. 1804. (B. M. 6297.)

**X. Preissii** (Preiss)\*. *fl.*, perianth segments about  $\frac{1}{2}$ in. long, the outer ones oblong, the inner ones broader; spike 1in. in diameter; scape 2ft. to 6ft. long (including the spike, which occupies half to nearly the whole length). April. *l.* from a short, flat base, 2ft. to 4ft. long, one to two lines broad, rigid, very brittle when young. Caudex thick and simple, short, or attaining 5ft. to 6ft. (sometimes, according to Oldfield, as much as 15ft.). (B. M. 6933.)

**X. quadrangula** (quadrangular). *fl.*, spike 3ft. to 4ft. long,  $\frac{1}{2}$ in. in diameter when in flower; scape as long, or longer. *l.* slender but rigid, 1ft. long, strictly quadrangular, though sometimes slightly flattened, rarely above one line broad. Caudex lengthening out to several feet. 1874. (B. M. 6075.)

**XANTHOS.** This term, used in Greek compounds, signifies such yellow as gamboge; e.g. Xanthophyll, the yellow colouring matter of plants.

**XANTHOSIA** (from *xanthos*, yellow; alluding to the yellow down with which some of the species are covered). SYN. *Leucolœna*. ORD. *Umbellifereæ*. A genus comprising seventeen species of greenhouse herbs or small shrubs, diffuse or decumbent at the base, or erect, often clothed with long, soft hairs, mixed with a stellate tomentum, natives of Australia. Calyx lobes peltate, cordate, or not attached by the whole of the base; petals with an induplicate point and reduplicate margins; umbels usually compound, the partial ones with two or three bracts, and several almost sessile flowers, the general one of three or four rays, and as many bracts, but sometimes the whole umbel reduced to very few, or to a single flower. Leaves toothed, lobed, or ternately divided. The two species introduced require similar treatment to **Trachymene** (which see).

**X. hirsuta** (hairy). A synonym of *X. pilosa*.

**X. montana** (mountain-loving). A synonym of *X. pilosa*.

**X. pilosa** (pilose). *fl.* white; peduncles usually two at the nodes, each usually with two flowers, more rarely three or only one, with two or three short, narrow bracts forming a general involucre at the base of the short pedicels or rays. June. *l.* coarsely sinuate-toothed, three or five-lobed or rarely three-parted, the central lobe always longer than the lateral ones, rarely exceeding 1in. in length. *h.* 1ft. to 2ft. 1826. An erect, or more frequently diffuse or procumbent shrub. SYNS. *X. hirsuta*, *X. montana*.

**X. rotundifolia** (round-leaved)\*. *fl.* white, rather numerous, on very short pedicels; peduncles long, each bearing a rather large, compound umbel; rays usually four, with a sessile umbelline in the centre; involucre bracts petal-like. June. *l.* shortly petiolate, nearly orbicular, irregularly and acutely toothed,  $\frac{1}{2}$ in. in diameter, glabrous or woolly beneath, especially when young. Stems erect, 1ft. to 2ft. high, often woody at base. 1836. (B. M. 3582.)

**XANTHOSOMA** (from *xanthos*, yellow, and *soma*, a body; alluding to the large, lobed, depressed, yellow stigma). Including *Acontias* and *Phyllotanium*. ORD. *Aroideæ* (*Araceæ*). A genus consisting of about twenty-five species of stove, milky, perennial herbs, inhabiting tropical America. Flowers monœcious, the imperfect males between the perfect ones and the females; spathe tube oblong or ovoid, convolute, accrescent, persistent, at length bursting irregularly, the throat constricted, the lamina boat-shaped; spadix inappendiculate, shorter than the spathe, and adnate with it at base; male inflorescence cylindrical or clavate, elongated, the imperfect

**Xanthosoma**—*continued*.

portion constricted; female shorter, dense-flowered, attenuated above; peduncles one or several, rarely elongated. Leaves sagittate, hastate, or pedatisect, on long



FIG. 233. XANTHOSOMA BARILLETI.

and thick petioles. The best-known species are here described. They thrive in any rich, light, well-drained soil. Propagation is effected by cutting up the stem or rootstock into small portions, and planting these in light soil, or in cocoa fibre, in bottom heat. After a stem has been cut off, a large number of shoots are developed, which strike readily when submitted to the same treatment as that recommended for root-cuttings. Some of the species may be used for sub-tropical work: they should have a sheltered place in a well-drained bed, principally made up of leaf mould, and an abundance of water.

**X. auriculatum** (eared). *fl.*, spathe greenish outside, white within, 8 in. long, the tube ovoid-oblong, the lamina oblong-lanceolate, acuminate; spadix as long as the spathe. *l.* three-lobed, cordate-hastate; middle lobe oblong, acuminate, cuspidate; basal lobes recurved, spreading, oblong or ovate-oblong, twice or thrice as long as the middle lobe; petioles reddish, or green and rufous-striated or variegated. Brazil, 1869. (R. G. 1869, 603.)

**X. Barilleti** (Barillet's).\* *l.* arranged on a robust petiole attaining 3 ft. in length, deeply channelled at its base, which is broadly winged, the whole of a beautiful shining green;

**Xanthosoma**—*continued*.

blade digitately-palmate, divisions entire, unequal, strongly nerved, the median lobe 1 ft. to 1½ ft. long, of a dull green. Brazil, 1882. Plant caulescent. See Fig. 233. (R. H. 1882, p. 260.)

**X. belophyllum** (arrow-leaved). *fl.*, spathe 8 in. long, the tube greenish-white within, the lamina pale yellow, acuminate; spadix whitish, much shorter than the spathe. *l.* large, opaque and slightly pruinose above, cinereous or often pale greenish beneath, 1½ ft. to 2 ft. long, cordate-hastate; middle lobe shortly apiculate; basal ones semi-ovate, slightly acute. Stem short and thick. Venezuela and Guiana.

**X. helleborifolium** (Hellebore-leaved). *fl.*, spathe 3½ in. to 4 in. long, the tube green, ovoid, nearly glabrous, the lamina yellowish-green, oblong-lanceolate, shortly cuspidate; spadix 5 in. long; peduncles equalling or slightly exceeding the petioles. *l.* on very long petioles, green, spotted and striated with dark violet, reniform, pedatisect, 8 in. to 12 in. broad; segments five, nine, eleven, or thirteen, distant, the lateral ones unequally oblong or lanceolate, cuneate towards the base, acuminate at apex, gradually smaller. *h.* 1½ ft. to 2 ft. Venezuela, &c., 1793. SYNS. *Acontias helleborifolius*, *Arum helleborifolium*.

**X. Jacquinii** (Jacquin's). *fl.*, spathe tube green outside, dark purple within, 2½ in. long, the lamina pale greenish-yellow outside, whitish within, about 4 in. long; spadix whitish, sessile, about equalling the spathe; peduncles about 4 in. long, nearly ½ in. thick. *l.* on long petioles, broadly cordate-

sagittate, 1½ ft. to 2 ft. long; middle lobes rounded at apex, shortly apiculate; basal ones retrorse, obtuse, half as long as the middle one. Stem thick, about 2 ft. high. Venezuela, 1816.

**X. Lindenii** (Linden's).\* *l.* hastate-oblong, 1 ft. long, glabrous except the midrib, deep green, the midrib and numerous well-

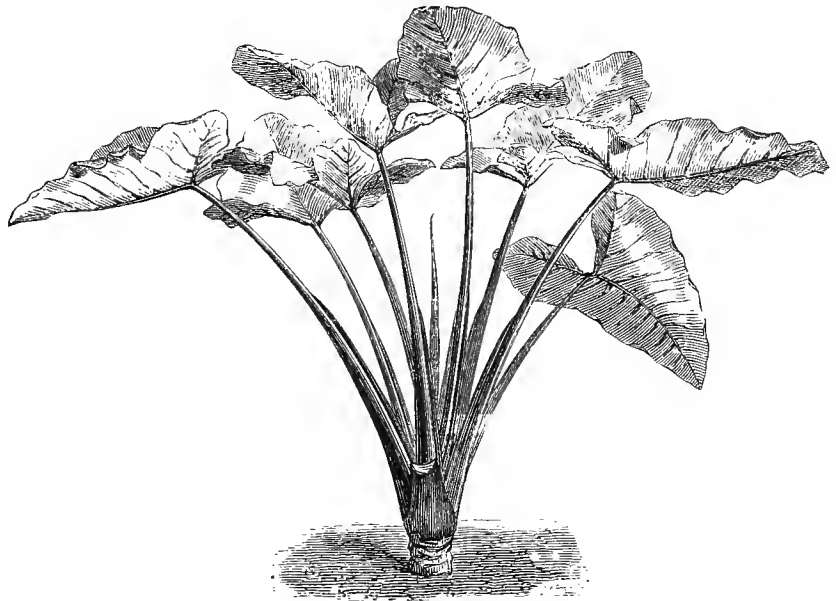


FIG. 234. XANTHOSOMA VIOLACEUM.

**Xanthosoma**—continued.

marked veins ivory-white; middle lobe oblong, acute; basal ones inequilateral, obtuse, exstorse; petioles rather longer than the blades, sheathing one-third their length. Rhizome tuberous. New Grenada, 1871. A showy, variegated plant. *SYN. Phyllo-tentium Lindenii* (L. H. 1872, 88).

**X. maculatum** (spotted). *l.* green, sagittate-triangular; petioles purplish, with a glaucous bloom, and margined on the sheathing portion with white. 1861. A bold-habited plant. *SYN. Alocasia albo-violacea*.

**X. Maximiliani** (Maximilian's). *fl.*, spathe 8 in. to 9 in. long, the tube glaucous-purple, green at back outside, within and at the throat blood-purple, ovoid, tumid, the lamina straw-coloured outside, sulphur-white within, the base and margins blood-purple; spadix straw-coloured and dirty orange. *l.* triangular-hastate, of a pleasing green; basal lobes broadly rhomboid. Stem tall. *h.* 5 ft. Brazil, 1860.

**X. mirabile** (wonderful). *fl.*, spathe primrose-yellow, 5 in. to 6 in. long, curved; spadix somewhat stipitate, shorter than the spathe. *l.* green, spotted with yellow, trisected, 10 in. to 12 in. long; segments ovate-lanceolate, acute, the lateral ones very inequilateral, shorter than the middle one; petioles three or four times as long as the leaves. Rhizome tuberous. South America, 1874. (G. C. 1874, ii., pp. 258, 259.)

**X. plumbea** (lead-coloured). A synonym of *Alocasia cuprea*.

**X. robustum** (stout). *fl.*, spathe 8 in. to 10 in. long, the tube green, the lamina whitish, broadly ovate-lanceolate, acute; spadix whitish, rather shorter than the spathe. *l.* opaque above, paler beneath, pruinose, sagittate-ovate, 1 ft. or more long; middle lobe semi-ovate, acutely cuspidate; basal ones sub-rhomboid or oblong, obtuse. Stem 4 in. to 8 in. long, nearly or quite 2 in. thick. Mexico.

**X. sagittifolium** (sagittate-leaved). Arrow-leaved Spoonflower. *fl.*, spathe 6 in. to 7 in. long, the tube greenish, the lamina whitish-green; spadix much shorter, and peduncles longer, than the spathe. *l.* 16 in. to 20 in. long, broadly sagittate-ovate, pruinose; middle lobe broadly semi-ovate, acuminate-apiculate, twice as long as the acute basal ones. Stem thick, erect, 3 ft. or more high. West Indies, 1710. (B. M. 4989.)

**X. violaceum** (violet).\* *fl.*, spathe tube glaucous and pale violet outside, yellowish-white within, oblong, 4 in. long, the lamina sulphur-white, 6 in. long; spadix violet and white, 7 in. long; peduncles 6 in. to 8 in. long. *l.* pruinose, at length green, paler beneath, 8 in. to 16 in. long, sagittate-oblong-ovate; middle lobe shortly acuminate-apiculate; basal ones a third or a quarter as long, sub-triangular; petioles brownish-violet, nearly twice as long as the blades. Rhizome short. West Indies, 1864. See Fig. 234.

**X. Wallisii** (Wallis'). *l.* large, hastate, of a rich dark green; veins white, or nearly so. Antioquia, 1869.

**XANTHOXYLUM.** See *Zanthoxylum*.

**XENIATRUM.** A synonym of *Clintonia* (which see).

**XENOCARPUS.** A synonym of *Cineraria* (which see).

**XENOPHONTA.** A synonym of *Barnadesia* (which see).

**XERANDRA.** A synonym of *Iresine* (which see).

**XERANTHEMUM** (from *xeros*, dry, and *anthemon*, a blossom; alluding to the dry nature of the flowers, which retain their form and colour for years). Immortelle. *SYN. Harrisonia* (of Necker). *ORD. Compositæ*. A small genus (four or five species) of hardy, erect, branched, hoary, annual herbs, inhabiting the Mediterranean region and the Orient. Flower-heads solitary, long-pedunculolate at the tips of the branches, heterogamous, disk-formed; involucre campanulate or oblong-cylindrical; bracts in several series, imbricated, the inner ones pink or whitish (rarely blue?); receptacle flat, with rigid pales; limb of the florets bilabiate. Leaves alternate, narrow, entire. The two best-known species are here described. Seeds only require sowing on a light, rich soil. Several plants formerly included here will now be found under *Helichrysum*, *Helipterum*, and *Phenocoma*.

**X. annuum** (annual).\* *fl.* heads purple; involucre hemispherical, highly glabrous, the inner bracts much longer, diverging-radiate; florets more than 100. July. *l.* linear or oblong, with revolute margins. *h.* 2 ft. South Europe, 1570. (J. F. A. 398.)

**X. erectum** (erect). A synonym of *X. inapertum*.

**X. inapertum** (not open). *fl.* heads white; involucre ovoid-oblong, highly glabrous, the inner bracts a trifle longer, scarcely radiating; florets thirty to forty. June. *l.* linear or oblong, with revolute margins. *h.* 2 ft. South Europe and Persia, 1836. *SYN. X. erectum*.

**XERONEMA** (from *xeros*, dry, and *nema*, a thread; the filaments dry and persist). *SYN. Scleronema*. *ORD. Liliaceæ*. A monotypic genus. The species is an interesting and elegant, stove perennial, with a very short rhizome and fascicled root-fibres. It thrives in a compost of rich, sandy loam and leaf mould. Propagation may be effected by seeds, or by division of the rootstock.

**X. Moorei** (Moore's). *fl.* clustered, erect, shortly pedicellate; perianth bright crimson, 3 in. to 4 in. long, persistent, the segments distinct, linear, erect, sub-equal; stamens six, exserted; raceme terminal, simple, secund, the rachis abruptly inflexed at base, often horizontal. *l.* clustered at the base of the stem, 12 in. to 16 in. long, erect. Stem erect, simple, about 20 in. long, with a few reduced leaves. New Caledonia, 1878. (G. C. n. s., x., p. 17; I. H. 1877, 297.)

**XEROPHYLLUM** (from *xeros*, dry, and *phyllon*, a leaf; alluding to the dry, Grass-like leaves). *ORD. Liliaceæ*. According to Baker, a monotypic genus. The species is a handsome, hardy, perennial herb. It succeeds in a peat border, and will, if treated with care, ripen seeds, by which means, and by division of the roots, the plant may be propagated.



FIG. 235. *XEROPHYLLUM ASPHODELOIDES*, showing Habit and detached Single Flower.

**X. asphodeloides** (Asphodel-like).\* Turkey's Beard. *fl.*, perianth whitish, six-parted, 3 in. long, the segments spreading, many-nerved at back; stamens six, hypogynous, rather shorter than the perianth; pedicels ascending, solitary, not jointed, 1 in. to 1 1/2 in. long; raceme dense, 4 in. to 6 in. long, 2 in. to 3 in. broad. May. *l.* radical, in a very dense rosette, subulate, persistent, 1 ft. to 1 1/2 ft. long, one line broad, reclined, rough on the margins, remarkably dry and rigid. Stem 1 ft. to 2 ft. high, its leaves reduced to bristle-like bracts. Rhizome thick. North America, 1765. See Fig. 235. (G. C. n. s., xiii., p. 433.) *SYNS. X. setifolium* (B. R. 1613), *Helonias asphodeloides* (B. M. 748).

**X. a. tenax** (tenacious). *fl.* rather larger; stamens equalling or exceeding the perianth. *l.* 3 in. to 4 in. broad. 1811.

**X. setifolium** (bristle-leaved). A synonym of *X. asphodeloides*.

**XEROPHYTA.** A synonym of *Vellozia* (which see).

**XEROTES** (from *xerotes*, dryness; alluding to the arid herbage). *SYN. Lomandra*. *ORD. Juncaceæ*. A genus comprising thirty species of greenhouse, perennial or rarely annual, rigid herbs, natives of Australia, one species being also found in New Caledonia. Flowers small, the males usually either in dense clusters or solitary along the branches of a panicle, sessile or pedicellate within short, scarious bracts; female inflorescences either similar to the males, or less branched, or reduced to single, sessile, globular heads, or rarely both sexes in dense, globular or oblong heads, along a simple rachis, or connected into a long, dense, cylindrical spike; scapes or peduncles short, or the inflorescences sessile in the tufts of radical leaves or at the ends of the leafy stems,

**Xerotes**—continued.

or more or less elongated below the inflorescence. Stems tufted. Only two species call for description in this work. Both are perennials, thriving in light, rich soil. They may be increased by division of the root.

**X. longifolia** (long-leaved). Australian Tussock Grass. *fl.* greenish-white; clusters dense, sessile along the rachis at the bases and ends of the branches; whole inflorescence 6in. to nearly 12in. long; scape 1ft. to nearly 2ft. high, much flattened below the panicle. June. *l.* radical or nearly so, 1ft. to 2ft. long, one to three lines broad, flat or concave, with a short, sheathing base, mostly two-toothed at apex. *h.* 3ft. 1798. (B. R. 1839, 3.)

**X. rigida** (rigid). *fl.* greenish-white, sessile in sessile clusters; inflorescence 1½in. to 2in. long, shortly branched at base; male scapes from some of the lower axils flat and broad, 1½in. to 2in. long. June. *l.* thick and rigid, less than 1ft. long, 2in. to 2½in. wide, spreading, obtuse, truncate, or two-toothed at apex, the short sheaths covering the base of the stem. Leafy stem shortly developed, rather thick, terminating a creeping rhizome. 1791. (L. B. C. 798.)

**KIMENESIA**. Included under **Verbesina** (which see).

**XIMENIA** (named after Francis Ximenee, a Spanish monk, who wrote a work on Mexican plants in 1615). *SYN. Heymassoli.* *ORD. Olacineæ.* A small genus (four species are known) of stove or greenhouse, glabrous or tomentose trees or shrubs; one is Mexican, another South African, a third inhabits the South Pacific Islands, and the fourth is broadly dispersed through the tropics. Flowers whitish, large for the order, in short, axillary cymes, or rarely solitary; calyx small, four or five-toothed or lobed; petals four or five, hypogynous; stamens eight or ten. Drupes ovoid or globose; flesh pulpy. Leaves alternate, entire, sub-coriaceous, often fasciated. The drupes of *X. americana* have a sweet, aromatic flavour, but are a little rough to the palate. This species thrives in a compost of loam and peat. Cuttings will readily root in sand, under a glass, in heat.

**X. americana** (American). False Sandalwood; Hog, Mountain, or Seaside Plum. *fl.* odorous, racemose or corymbose; petals four, oblong, villous internally, many times longer than the calyx. April. *fr.* oval or oblong, edible. *l.* 1½in. by 1in. and upwards, glabrous, ovate-oblong or roundish, emarginate, rounded at base. Branches covered with astringent bark, often ending in a spine. *h.* 20ft. Tropics, 1759. Stove tree.

**XIPHIDIUM** (from *xiphos*, a sword, and *eides*, likeness; alluding to the shape of the leaves). *ORD. Hæmodoraceæ.* A genus consisting of two species (perhaps varieties of one) of stove, perennial herbs, with short rhizomes, natives of tropical America. Flowers rather small, glabrous, shortly pedicellate at the sides of the simple panicle branches, unilateral; perianth tube none, the segments equal, oblong, spreading, not decurrent at base; stamens three, affixed at the base of the inner segments. Leaves rather broadly linear or long-lanceolate, distichous, membranous, equitant. *X. floribundum* thrives in an equal mixture of loam, peat, and sand. It may be readily increased by division of the roots.

**X. albidum** (whitish). A synonym of *X. floribundum*.

**X. floribundum** (bundle-flowered). *fl.* white or blue, eight to ten along the branches of the panicle; perianth segments ½in. long, oblong-lanceolate, glabrescent; panicle pubescent. May and June. *l.* oblong-lanceolate or oblong, 1in. to 2in. broad, acuminate, often distinctly mucronate at the edges, glabrous. *h.* 1ft. to 2ft. West Indies, 1856. (B. M. 5055.) *SYN. X. abidum.* *X. giganteum* is a very broad-leaved form, with entire margins.

**XIPHION**. Included under **Iris** (which see).

**XIPHOPTERIS**. Included under **Polypodium**.

**XYLOBIUM** (from *xylon*, wood, and *bios*, life; in allusion to the substance on which the plants grow). *ORD. Orchidæ.* A genus comprising about sixteen species of stove, epiphytal, tropical American Orchids, closely allied to *Maxillaria*. Flowers racemose, very shortly pedicellate; sepals erect, at length somewhat spreading, the lateral ones broader than the upper one,

**Xylobium**—continued.

adnate at base to the foot of the column, forming a chin; petals similar to the upper sepal, but smaller; lip sub-articulated with the foot of the column, sessile or contracted and incumbent at base, at length erect, the lateral lobes erect, clothing the erect, semi-terete column, the middle one short, broad, spreading; scapes at the bases of the pseudo-bulbs, erect, simple. Leaves ample or elongated, plicate-veined, contracted into the petioles. Stems short, many-sheathed, mostly thickened into a one or two-leaved, fleshy pseudo-hub. The best-known species are here described. For culture, see **Maxillaria** (under which the species were formerly classed).

**X. concavum** (concave-lipped). *fl.* pale yellow; lateral sepals falcate, acuminate; petals half as large as the sepals; lip almost truncate, concave, bluntly three-lobed, the middle lobe somewhat fleshy and tuberculated at the edge, rose-veined, with a long, narrow ridge in the middle, three-lobed at the point. *l.* twin, three-ribbed, shining, narrowed into the petioles. Pseudo-bulbs oblong, deeply furrowed. *h.* 9in. Guatemala, 1844. *SYN. Maxillaria concava* (L. & P. F. G. ii., p. 53).

**X. decolor** (discoloured). *fl.*, sepals and petals sulphur-coloured, the former ovate-oblong, obtuse, spreading, the latter half as large, connivent; lip whitish, absolutely three-lobed, obtuse, hooded, with five elevated, parallel calli; scapes radical, many-flowered. *l.* solitary, oblong-lanceolate, acuminate at both ends, 1ft. to 1½ft. long. Pseudo-bulbs oblong, compressed. *h.* 1ft. Jamaica, 1830. *SYN. Maxillaria decolor* (B. M. 3981; B. R. 1549).

**X. elongatum** (elongated). *fl.* in a dense, oblong raceme; sepals and petals pale, linear, acuminate; lip purplish-brown, warted, ovate-oblong, very fleshy; scapes erect, two-sheathed. *l.* lanceolate, three-ribbed, about twice as long as the elongated, cylindrical pseudo-bulbs. *h.* 1ft. Central America, 1847. *SYN. Maxillaria elongata* (L. & P. F. G. iii., p. 69.)

**X. foveatum** (foveate). *fl.* of a pale, uniform straw-colour, faintly scented; sepals and petals linear-oblong; lip three-lobed at apex, the middle lobe rounded, fleshy, excavated. *l.* lanceolate, undulated, thrice as long as the raceme. *h.* 1ft. Demerara, 1839. Allied to *X. squalens*. *SYN. Maxillaria foveata*.

**X. pallidiflorum** (pale-flowered). *fl.* pedicellate; sepals and petals pale, linear, acuminate; lip three-lobed, the lower sepals broadly falcate; lip whitish at back, reflexed above, somewhat truncate-emarginate at apex; racemes erect, three to seven-flowered. *l.* oblong, acuminate, glabrous, 8in. to 10in. long, three-ribbed, arcuate-recurved, attenuated into the petioles. Pseudo-bulbs densely aggregated, cylindrical, 6in. to 7in. long. *h.* 1ft. Venezuela, 1826. *SYN. Maxillaria pallidiflora* (B. M. 2806).

**X. squalens** (squalid). *fl.* pale, dingy yellowish-flesh-coloured, numerous, in a dense, thyrsiform raceme; two of the petals and the three-lobed lip streaked with purple, the side lobe of the lip deep purple; scape 4in. to 6in. high, brown-sealy. *l.* two to a pseudo-bulb, 8in. to 12in. long, tapering into footstalks, strongly five-ribbed. Pseudo-bulbs several, oblong, dark green, sheathed with brown scales. Brazil, 1828. *SYN. Maxillaria squalens* (B. M. 2955), *Dendrobium squalens* (B. R. 732).

**XYLOMELUM** (from *xylon*, wood, and *melon*, an apple; alluding to the woody fruit). *ORD. Proteaceæ.* A small genus (four species) of greenhouse trees or tall shrubs, endemic in Australia. Flowers sessile in pairs within each bract, disposed in opposite, dense spikes; perianth regular, with revolute segments; bracts small. Fruit large, ovoid or tapering above the middle, very thick and woody, tardily opening along the upper side, or in two valves. Leaves opposite, entire or prickly-toothed. The fruits are known in Australia as Wooden Pears. Only one species has been introduced. It thrives in a compost of sandy peat and fibry loam. Ample drainage must be given. Propagated by cuttings of young and rather firm shoots; or by seeds, sown in slight heat.

**X. pyriforme** (pear-fruited). *fl.*, spikes very dense, 2in. to 3in. long, usually clustered three to six together, at first appearing terminal, but soon becoming lateral. *fr.* 2½in. to 3in. long, above 1in. in diameter near the base, tapering above the middle. *l.* of the flowering branches entire, lanceolate or ovate-lanceolate, very acute, 4in. to 6in. long; those of flowerless branches or young shoots often sinuate and prickly-toothed, attaining 8in. in length. 1869. A moderate-sized tree.

**XYLOPHYLLA**. Included under **Phyllanthus** (which see).

**XYLOPIA** (abridged from *xylopicron*, which is from *xylon*, wood, and *pikros*, bitter; the wood of some of the species is intensely bitter). Bitter Wood. *ORD. Anonaceæ.* A genus comprising nearly thirty species of

**Xylopia**—*continued*.

leafy, stove trees or shrubs; five are Indian, six or seven African, and the rest inhabit America. Flowers solitary or fasciated in the axils, sessile or shortly pedicellate; sepals three, more or less connate, valvate; petals six, biseriate, the inner ones included; stamens indefinite. Leaves coriaceous, often distichous. It is doubtful whether the under-mentioned tree is still grown in gardens. A compost of sandy loam and fibry peat, to which is added a small quantity of broken bricks, charcoal, and dried cowdung, is most suitable for its culture. Propagated by cuttings of the hard shoots, inserted in sandy soil, in heat.

**X. glabra** (smooth). *f.*, corolla silky; outer petals  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long; bracteoles somewhat remote from the calyx, deciduous. *l.* lanceolate, taper-pointed, 2 in. to 3 in. long, downy beneath, clothed with appressed hairs in the younger state. *h.* 20 ft. West Indies, Venezuela, and Guiana, 1820.

**XYLOSTEUM**. Included under *Lenicera* (which *see*).

**XYRIDÆE**. A small natural order of perennial or rarely annual, Rush-like or Sedge-like, tufted herbs, broadly dispersed over the warmer regions of the globe, often growing in watery places. Flowers hermaphrodite, scarcely irregular, in terminal, solitary heads of densely imbricating, rigid, scarious, one-flowered bracts; perianth of six segments in two series, the three outer segments calycine, the three inner petaloid; stamens three to six, inserted on the inner perianth segments, three opposite fertile, the others sterile, penicillate, or obsolete; filaments filiform; anthers two-celled. Capsule one-celled, loculidally three-valved, or three-celled and fenestrate at base, operculate above; scapes erect, simple. Leaves radical, rosulate or clustered, linear or rarely linear-lanceolate, sheathing at base, often equitant. Roots fibrous. The leaves and roots of these plants are used in the cure of itch in India and South America. The order embraces two genera—*Abolboda* and *Xyris*—and less than fifty species.

**XYRIS** (an old Greek name used by Dioscorides for *Iris fatidissima*). Yellow-eyed Grass of North America. **ORD. Xyridæe**. A genus comprising about forty species of stove, greenhouse, or hardy, perennial or rarely annual, Rush-like herbs, broadly dispersed over the warmer regions of the globe. Flower-heads globose, ovoid, or rarely hemispherical or shortly cylindrical; sepals petaloid, very broad, more or less distinctly three-nerved; corolla lobes ovate; staminodes often three. Leaves radical, linear, rigid or Grass-like, tufted or distichous, surrounding the scape. *X. operculata*, the only species worth describing here, thrives in light, rich soil. It may be increased by divisions of the root.

**X. operculata** (covered). *f.* heads ovoid to globular, four to six lines in diameter, the scales black; scapes slender, 1 ft. to 1 ft. high, inclosed at base in a rather long sheath without any lamina, in the centre of the tuft of leaves. June. Sheaths shining brown, some of them produced into very narrow, almost subulate leaves, mostly less than 6 in. long. Australia, 1804. Stove perennial. (B. M. 1158; L. B. C. 205.)

**XYSMALOBium** (from *xyasma*, a fragment, and *lobes*, a division; alluding to the minute divisions of the corona). **ORD. Asclepiadæe**. A genus consisting of about eight species of stove or greenhouse, perennial herbs, natives of tropical and South Africa. Flowers in umbelliform cymes; calyx five-parted, having five or many glands at the base within; corolla somewhat rotate-campanulate, five-cleft, the lobes reflexed-bearded or naked within; coronal scales five, affixed to the staminal tube. Leaves opposite, broadly lanceolate or linear. *X. padifolium*, the only species known in gardens, requires similar treatment to that recommended for *Gomphocarpus*.

**X. padifolium** (Cherry-leaved). This is the correct name of the plant described in this work under the name of *Gomphocarpus padifolius*.

**YAM**. *See* *Dioscorea*.

**YANG-MAE-TREE**. A common name for *Myrica Nagi* (which *see*).

**YARROW**. A popular name for *Achillea* (which *see*).

**YARROW, SOLDIERS'**. A name applied to *Stratiotes aloides* (which *see*).

**YATE OR YEIT TREE**. A common name for *Eucalyptus cernuta* (which *see*).

**YELLOW ARCHANGEL**. A name applied to *Lamium Galeobdolon* (which *see*).

**YELLOWBY**. A common name for *Chrysanthemum segetum* (which *see*).

**YELLOW CRESS**. A popular name for *Barbarea præcox* (which *see*).

**YELLOW ELDER**. *See* *Tecoma stans*.

**YELLOW EVERLASTING**. *See* *Helichrysum arenarium*.

**YELLOW-EYED GRASS** (of North America). *See* *Xyris*.

**YELLOW GARDEN HAWK WEED**. *See* *Tolpis barbata*.

**YELLOW IRIS**. *See* *Iris Pseudo-acorus*.

**YELLOW LARKSPUR**. *See* *Tropæolum*.

**YELLOW RATTLE**. *See* *Rhinanthus Crista-galli*.

**YELLOW ROCKET**. *See* *Barbarea vulgaris*.

**YELLOW SLUG** (*Limax flavus*). In its habits this Slug differs from the other *Slugs* (which *see*), as it very frequently lives in cellars and other damp places in towns. During the day it lies concealed; but at night it goes in search of its food, and shows itself very partial to cooked articles. Though it prefers potatoes and other vegetables, it will readily eat any kind of meat. The Yellow Slug may also be found in gardens and in woods; and where one occurs, others are seldom far off, as it is gregarious in its habits. It may reach a length of 4 in. to 5 in., but is usually found of a smaller size. The body is yellowish, spotted with dark brown, and is covered with numerous short, longitudinal ridges. There is a distinct keel on the upper surface of the tail. Other *Slugs* also are often more or less yellow in colour, but the size, habits, and markings of *L. flavus* will suffice to distinguish it from them. The remedies recommended under *Slugs* are applicable against this species.

**YELLOW STAR FLOWER**. *See* *Sternbergia lutea*.

**YELLOW STAR OF BETHLEHEM**. *See* *Gagea lutea*.

**YELLOW SULTAN**. *See* *Centaurea suaveolens*.

**YELLOW UNDERWING**. *See* *Tryphæna*.

**YELLOW-WEED, DYER'S**. *See* *Reseda lutea*.

**YELLOW WOOD**. A name applied to *Cladrastis tinctoria*, *Ochrosia borbonica*, several species of *Podocarpus*, &c.

**YELLOW-WORT**. *See* *Chlora*.

**YEVEERING BELLS**. A common name for *Pyrola secunda* (which *see*).

**YEW**. *See* *Taxus*.

**YEW-BUD GALLS**. The buds of the Yew (*Taxus baccata*) are liable to be injured by a Gall Midge, and also by a Gall Mite. The former (*Cecidomyia Tarsi*)



**Yew-bud Galls**—*continued*.

produces a cone-shaped Gall at the tips of the young twigs, composed of crowded, overlapping leaves (see Fig. 236), which remain short, but become broader than the healthy leaves; they are like the latter in colour. The larvæ live between the altered leaves. The Galls are usually of the size figured. They are generally solitary; but two or three may be present at the tip of a twig. The simplest method for preventing harm to the trees from this cause is to pick off the *young* Galls, as this destroys the larvæ.



FIG. 236. MONÆCIOUS BRANCHLET OF YEW (*Taxus baccata*), showing (g) Gall of *Cecidomyia Taxi*.

The Gall Mite (*Phytoptus Taxi*) is a much more dangerous foe. It attacks the leaf-buds, and also the male and female flowers, all of which enlarge, and may reach  $\frac{1}{2}$  in. in diameter, becoming, at the same time, yellow or red. The galled organs are fleshy, and are covered with small, translucent warts. Between them live multitudes of the minute Gall Mites. The Galls remain on the branches all winter, serving for the protection of the Mites. These crawl out the following spring, and produce new Galls in the younger buds. Mr. Andrew Murray was the first to describe these Galls, from examples found by Professor Thistleton Dyer, near London, in 1875. Mr. Murray describes the branches as looking as if frost-bitten. The most effectual—indeed, the only reliable—remedy is to remove the galled branches and burn them, while the Mites are still in the Galls.

**YEW-BUD MITE.** See **Yew-bud Galls**.

**YEW, CHINESE.** See **Podocarpus chinensis**.

**YEW, CLUSTER-FLOWERED.** See **Cephalotaxus**.

**YEW GALLS.** See **Yew-bud Galls**.

**YEW, JAPANESE.** A common name for **Cephalotaxus pedunculata fastigiata** (which see).

**YEW, JOINTED.** A popular name for **Athrotaxis** (which see).

**YEW, LORD HARRINGTON'S.** See **Cephalotaxus pedunculata**.

**YEW, PRINCE ALBERT'S.** See **Saxegothea conspicua**.

**YEW, STINKING.** See **Torreya**.

**YOKE ELM.** A name applied to **Carpinus Betulus** (which see).

**YOUTH AND OLD AGE.** See **Zinnia**.

**YOUTHWORT.** A common name for **Drosera rotundifolia** (which see).

**YPONOMEUTA.** A form, sometimes used incorrectly, of the name *Hyponomeuta*, a genus of small Moths, whose web-forming larvæ are often destructive to various kinds of garden trees and shrubs. See **Hawthorn Caterpillars**.

**YUCCA** (a native name of the genus). Adam's Needle; Bear's Grass; Spanish Bayonet. ORD. *Liliaceæ*. A genus (comprising, according to Engelmann twelve, according to Baker twenty-one, species) of handsome, stove, greenhouse, or hardy plants, allied to *Dracæna* and *Cordylina*; they inhabit the Southern United States, Mexico, and Central America. Flowers rather large, shortly pedicellate at the sides of the panicle branches, pendulous; perianth segments distinct or scarcely connate near the base, lanceolate-ovate, rather thick, more or less connivent in a globe; stamens six, hypogynous, erect, much shorter than the perianth; filaments rather thick; anthers small, sessile or adnate with the tips of the filaments; panicle terminal, showy, many-flowered, sub-sessile amongst the leaves, or supported on a bracteate peduncle. Fruit sometimes fleshy, pulpy, or nearly spongy, sometimes dry, septicidally or loculidally three-



FIG. 237. POD OF YUCCA.

valved (see Fig. 237). Leaves clustered at the apex of the caudex, linear-lanceolate, thick and rigid or rarely flaccid, usually spinescent at apex, the margins entire or filamentose. Caudex or stem woody, sometimes dwarf, sometimes at length tall and arborescent, branched. All the Yuccas thrive in a rich, light soil, and may be propagated either by divisions, planted in the open ground, or by means of pieces of the thick, fleshy roots, cut into lengths, and inserted in sandy soil, in heat. Seeds of any of the species are rarely, if ever, produced in this country. Many of the plants make noble objects if properly placed and suitably treated. The greenhouse ones may be plunged in their pots, &c., and used for sub-tropical effects in the open air during the summer months. Except where otherwise indicated, the under-mentioned species are hardy.

Most of the descriptions are translated from Mr. Baker's admirable Monograph of *Alotnæ* and *Yuccoideæ*, which appeared in the "Journal of the Linnean Society," vol. xviii.

**Yucca**—continued.

**Y. acuminata** (taper-pointed), of Sweet. A form of *Y. gloriosa*.

**Y. acuminata** (taper-pointed), of gardens. A synonym of *Y. flexilis*.

**Y. acutifolia** (acute-leaved). *fl.* large, pendent, moderately expanded; perianth strongly striated and spotted with dark brown; panicle columnar, about 5ft. high, the flowering branches short and erect. Summer. *l.* sub-erect, stiff, channelled, shortly acuminate, 2½ft. long, bordered by a line of deep red. French gardens, 1869.

**Y. agavoides** (Agave-like). A garden synonym of *Y. Treculeana*.

**Y. albo-spica** (white-spiked). A synonym of *Y. constricta*.

**Y. aloifolia** (Aloe-leaved).\* *fl.*, perianth white, 1½in. to 2in. long, the segments oblong or oblong-lanceolate, ½in. to 1in. broad; lower pedicels 1in. to 1½in., upper ones ½in. to ¾in., long;

**Yucca**—continued.

FIG. 239. YUCCA ANGUSTIFOLIA STRICTA.

glaucous-tinged, with a pungent, reddish-brown horn at the tip, the margins whitish, serrulated. Stem slender, sometimes 15ft. to 20ft. high, usually simple. West Indies to North Carolina. Greenhouse. (B. M. 1700; P. M. B. iii. 25.) The following, most of which are often classed as species, are regarded, by Baker, as varieties of *Y. aloifolia*: *Atkinsi* and *purpurea*, dwarf, with purplish leaves; *arcuata*, *crenulata*, and *tenuifolia*, small forms, with narrow, more or less arched leaves; *conspicua*, leaves looser, broader, recurved, 1½in. broad; *Draconis* (G. C. 1870, p. 828), leaves looser, longer, recurved; *quadricolor*, leaves reddish-tinged; *tricolor* (= *lineata-lutea*), a common form in gardens, having leaves variegated with white and yellow; *variegata*, leaves with whitish stripes.

**Y. angustifolia** (narrow-leaved), of Pursh.\* *fl.*, perianth greenish outside, campanulate, the segments oblong, acute, 2in. to 2½in. long, ½in. to 1½in. broad; pedicels ½in. to 1in. long; raceme terminal, thirty to forty-flowered, sometimes simple, often with a few ascending branches at the base, 3ft. to 4ft. long; peduncle nearly 1ft. long. July. *l.* 100 or more, dense,

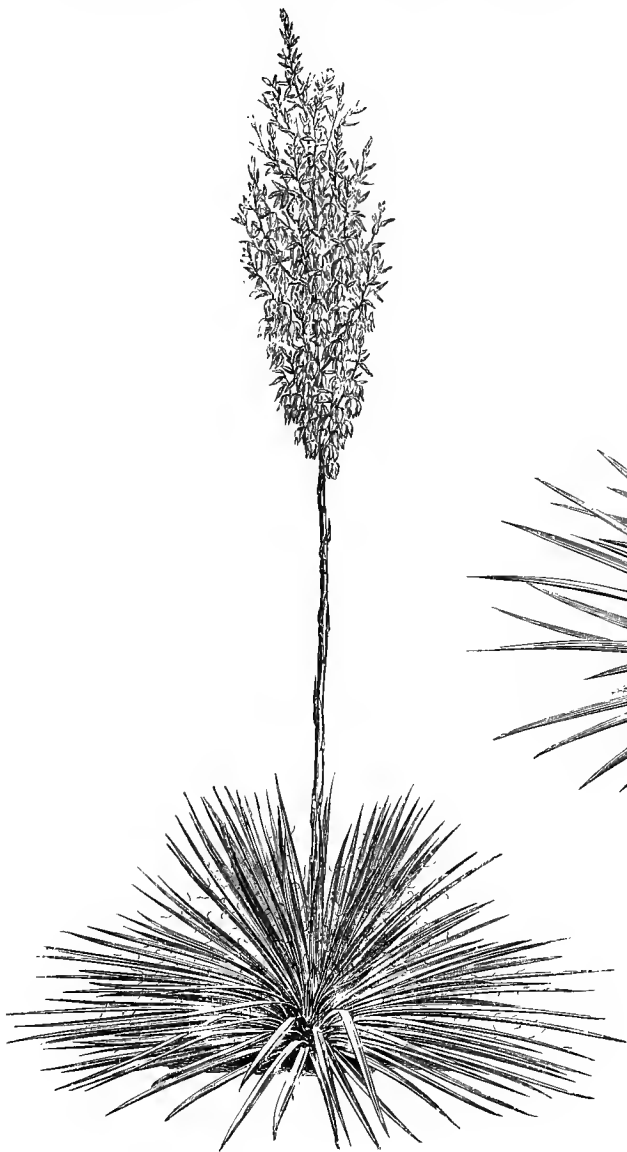


FIG. 238. YUCCA ANGUSTIFOLIA.

panicle rhomboid, dense, 1ft. to 2ft. long, the branches ascending; peduncle very short. May and June. *l.* fifty to 100 rigid, ensiform, 1ft. to 1½ft. long, 1in. to 1½in. broad, green,

**Yucca**—continued.FIG. 240. *YUCCA FILAMENTOSA*.

rigid, linear, 1½ ft. to 2 ft. long, three to four lines broad, channelled above, pungent-pointed, the pale reddish-brown margins copiously filamentose. Missouri, &c., 1811. Plant nearly stemless. See Fig. 238. (B. M. 2236.)

**Y. a. stricta** (straight). *fl.*, inflorescence more compound; peduncle 2 ft. to 3 ft. long. *l.* ½ in. to ¾ in. broad, narrowed at base, less rigid, and less pungent-pointed. Arkansas, 1817. See Fig. 239. (B. M. 2222, under name of *Y. stricta*.)

**Y. angustifolia** (narrow-leaved), of Carrière. A synonym of *Y. constricta*.

**Y. angustifolia** (narrow-leaved), of gardens. A synonym of *Y. flexilis*.

**Y. antwerpensis** (Antwerp). A form of *Y. filamentosa*.

**Y. arcuata** (arcuate). A form of *Y. aloifolia*.

**Y. argospatha** (white-spathed). *fl.*, perianth pure white, large; pedicels long and slender; bracts satiny-white, undulated; panicle pyramidal. Summer. *l.* numerous, channelled, 2 ft. to

**Yucca**—continued.

2½ ft. long, having reddish, finely-denticulate margins, and a sharp, brownish-yellow, spiny point. Stem short. Grenoble Botanic Garden, 1868. Allied to, and perhaps a form of, *Y. Tre-culeana*.

**Y. argyrophylla** (silvery-leaved). A synonym of *Furcraea Bedinghausii*.

**Y. Atkinsi** (Atkins'). A form of *Y. aloifolia*.

**Y. baccata** (berried). *fl.*, perianth white, 2 in. to 3 in. long, the segments oblong-lanceolate, ½ in. to ¾ in. broad; bracts large, lanceolate; inflorescence 5 ft. to 6 ft. long, on an elongated peduncle, the branches 6 in. long, often glabrous. Summer. *fr.* purple, ovoid or oblong, baccate, 3 in. to 5 in. long, edible. *l.* ensiform, thick, very rigid, 1½ ft. to 3 ft. long, 1 in. to 2 in. broad, scabrous, slightly concave above, pungent-tipped, the reddish-brown margins copiously filamentose, very squarrose. *h.* 8 ft. to

FIG. 241. *YUCCA FILAMENTOSA FLACCIDA*.

10 ft.; or plant stemless. Colorado, 1873. Hardy or half-hardy. (I. H. n. s. 115.)

**Y. b. australis** (Southern). A synonym of *Y. filifera*.

**Yucca**—*continued*.

**Y. b. circinata** (curled-threaded). *l.* 2ft. to 2½ft. long, five to six lines broad, copiously circinate-thready.



FIG. 242. YUCCA FILAMENTOSA ORCHIOIDES.

**Y. b. fragilifolia** (fragile-leaved). *l.* weaker than in the type, the outer ones recurved, 1½ft. long, six to seven lines broad, the margins having a few threads above only. Trunk short and slender.

**Yucca**—*continued*.

**Y. b. scabrifolia** (scabrous-leaved). *l.* rather fragile, the outer ones recurved, 1½ft. to 2ft. long, four to five lines broad, of a

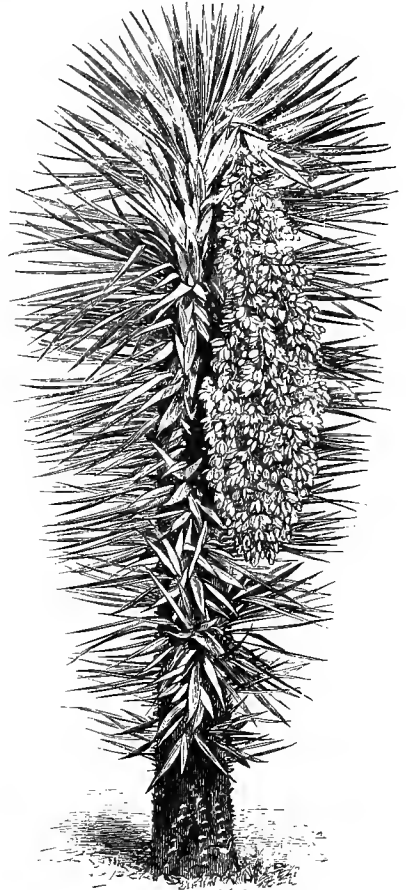


FIG. 243. YUCCA FILIFERA.

pleasing green, paler in the middle, and channelled above, rounded at back, the margins arcuate-filamentose.

**Y. Boerhaavii** (Boerhaav's). *l.* about 200, linear, straight, the lower ones only recurved, 2ft. or more long, ¼in. to ½in. broad,

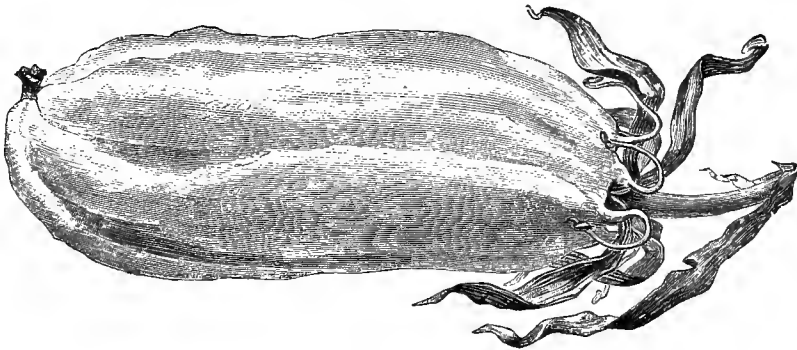


FIG. 244. FRUIT OF YUCCA FILIFERA.

**Y. b. periculosa** (dangerous). *l.* straight, 2½ft. to 3ft. long, eight to nine lines broad, channelled from base to apex, copiously filamentose in the upper half.

acuminate, much dilated at base, green (young ones slightly glaucous), scarcely pungent at apex, the margins entire, narrowly bordered with red-brown or paler. Mexico (?), 1870. Greenhouse.

**Yucca**—continued.

- Y. canaliculata** (channelled). A form of *Y. Trecculana*.  
**Y. circinata** (curled-threaded). A form of *Y. baccata*.  
**Y. concava** (concave), of Haworth. A form of *Y. filamentosa*.  
**Y. concava** (concave), of gardens. A synonym of *Y. Trecculana*.  
**Y. conspicua** (conspicuous). A form of *Y. aloifolia*.  
**Y. stricta** (constricted). *fl.*, perianth white, 2in. long, the segments oblong, acute; pedicels four to six lines long; panicle deltoid, 3ft. to 4ft. long, the branches ascending, 6in. to 9in. long, ten to fifteen-flowered; peduncle elongated. Summer. *l.* 100 to 200, dense, rigid, linear, 1½ft. to 2ft. long, six to eight lines broad, slightly narrowed at base, channelled above, pungent-tipped, the narrow, red-brown margins very filamentose. Stem simple, 3ft. to 5ft. high. Utah to North Mexico, 1862. Half-hardy. *SYNS.* *Y. albo-spica* (F. d. S. ser. ii., vii., p. 110), *Y. angustifolia*, of Carrière (R. H. ix. 1860, f. 3).  
**Y. contorta** (twisted). A name applied in gardens to both *Y. rupicola* and *Y. Trecculana*.  
**Y. cornuta** (horned). A garden synonym of *Y. Trecculana*.  
**Y. crenulata** (crenulate). A form of *Y. aloifolia*.

**Yucca**—continued.

- ¾in. long; bracts large, scarious; panicle rhomboid, the branches flexuous, ascending, 6in. long; peduncle elongated; inflorescence 4ft. to 8ft. long. June. *l.* thirty to fifty, in a dense rosette, ensiform, 1½ft. to 2ft. long, 1½in. to 2in. broad, rather firm, Reed-like, slightly glaucous, the whitish margins clothed with thread-like filaments. North America, 1675. Plant stemless or nearly so. See Fig. 240. (B. M. 900; Ref. B. 324; R. H. 1860, p. 214.)  
**Y. f. antwerpensis** (Antwerp). *fl.*, panicle 1ft. to 1½ft. long, the branches four to six, shortly pubescent; inflorescence 2ft. to 3ft. long. *l.* fifteen to twenty, erecto-patent, 1ft. to 1½ft. long, 1in. broad, the marginal threads few and very slender. 1875. (B. M. 6316, under name of *Y. orchoides major*.)  
**Y. f. aureo-variegata** (golden-variegated). *l.* marked with bright yellow, longitudinal bands. 1884. Greenhouse.  
**Y. f. concava** (concave). *l.* 1½ft. long, 3in. to 4in. broad, erect-incurved, concave on the face. 1810.  
**Y. f. flaccida** (flaccid)\* *fl.*, perianth segments broad; panicle branches pubescent. *l.* slenderer and weaker than in the type, much recurved, the marginal fibres stronger. 1816. See Fig. 241. *SYN.* *Y. flaccida* (B. R. 1895; Ref. B. 325; R. H. 1859, p. 556).

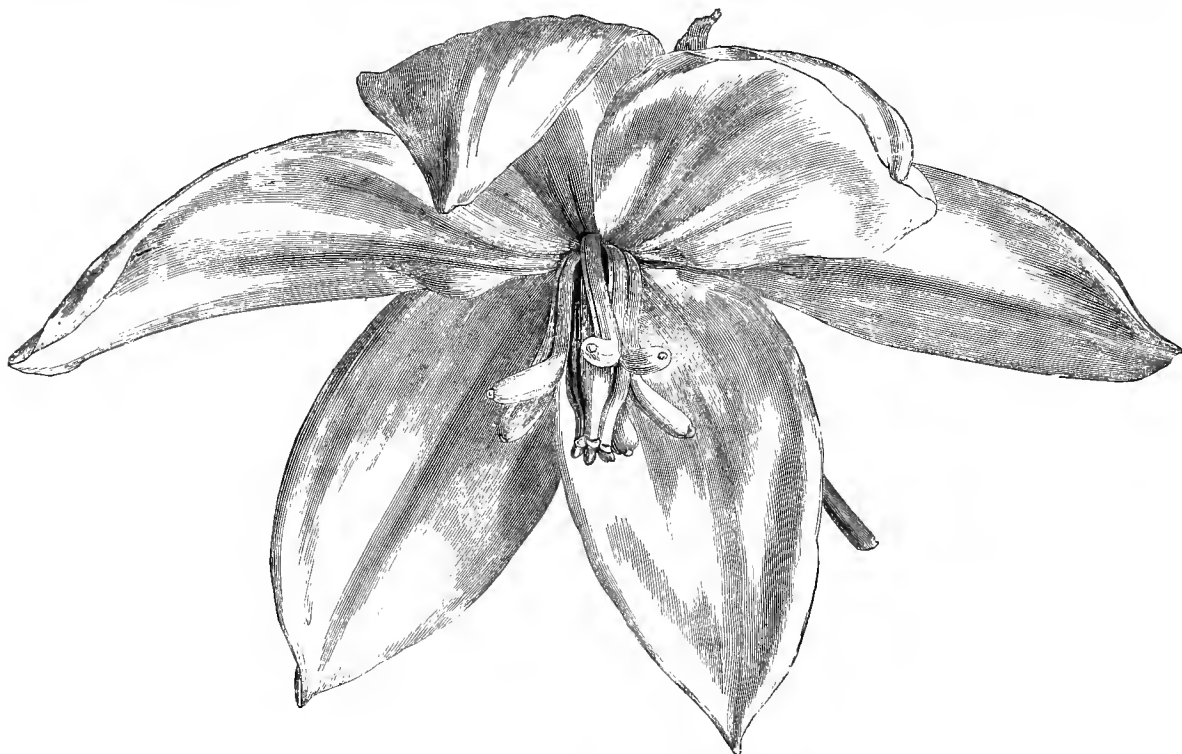


FIG. 245. FLOWER OF YUCCA FLEXILIS (natural size).

- Y. Desmetiana** (De Smet's). *l.* 100 to 200, rather loosely disposed, linear, nearly 1ft. long, ¾in. to ¾in. broad, all recurved, the young ones purple, glaucous, the old ones green, not pungent at apex, with narrow, pale, serrulated margins, dilated at base. Mexico, 1868. Greenhouse.  
**Y. Draconis** (dragon's). A form of *Y. aloifolia*.  
**Y. Ellacombei** (Ellacombe's). A form of *Y. gloriosa*.  
**Y. ensifolia** (sword-leaved). A form of *Y. flexilis*.  
**Y. exigua** (dwarf). *fl.*, perianth white, tinged with green outside, the segments oblong, acute, 1½in. long; bracts large, lanceolate; pedicels very short; panicle loose, 3ft. long, the branches pubescent, ascending, 6in. long; peduncle elongated, furnished with much-reduced, lanceolate leaves. Summer. *l.* thirty to forty, ensiform, 1½ft. long, 1in. to 1½in. broad, similar to those of *Y. gloriosa*, the margins brown, entire. Western North America, 1873. Plant stemless. (Ref. B. 314.)  
**Y. falcata** (sickle-leaved). A form of *Y. flexilis*.  
**Y. filamentosa** (thready). Silk Grass. *fl.*, perianth white, tinged with green outside, 1½in. to 2in. long, the segments oblong or oblong-lanceolate, ¾in. to ¾in. broad; pedicels drooping, ¾in. to
- Y. f. glaucescens** (glaucous). *fl.*, perianth segments fifteen to sixteen lines long; panicle and rachis densely clothed with bluish-grey pubescence. *l.* more glaucous than in the type, 1in. broad, the marginal threads rarely slenderer. 1819. *SYN.* *Y. glaucescens* (S. B. F. G. 53).  
**Y. f. grandiflora** (large-flowered). A synonym of *Y. f. maxima*.  
**Y. f. major** (greater). A synonym of *Y. f. maxima*.  
**Y. f. maxima** (largest). *fl.*, perianth 2½in. to 3in. long, the segments more acuminate than in the type. 1873. (Ref. B. 325.) This is also known as *Y. f. grandiflora* and *Y. f. major*. There is a white-variegated form.  
**Y. f. orchoides** (Orchis-like)\* *fl.*, perianth segments ovate, 1in. long; raceme simple, 9in. long; peduncle 1½ft. long. *l.* ten to twelve, 6in. to 9in. long, eight to ten lines broad, scarcely filamentose on the margins. 1861. See Fig. 242. *SYN.* *Y. orchoides* (R. H. 1861, p. 370).  
**Y. f. puberula** (puberulous). *fl.*, perianth segments oblong-lanceolate, 1½in. to 1½in. long; panicle branches pubescent. *l.* weaker and more recurved than in the type. *SYN.* *Y. puberula* (Ref. B. 322; S. B. F. G. 251).

**Yucca**—continued.

**Y. filifera** (bread-bearing). *fl.*, inflorescence 6ft. to 8ft. long, on a short peduncle, the branches sometimes 2ft. long. *fr.* fleshy, indistinctly ribbed, pendulous in a young state, erect afterwards. *l.* 1½ft. long, obscure green, lightly channelled, lin. to 1½in. broad. Trunk sometimes 50ft. high, 2ft. to 3ft. in diameter. Mexico, 1826. Greenhouse. See Figs. 243 and 244 (R. H. 1876, p. 433.) SYN. *Y. baccata australis* (of Baker).

**Y. flaccida** (flaccid). A form of *Y. filamentosa*.

**Y. flexilis** (flexible). *fl.*, perianth white, 3in. long, the segments oblong, acute; pedicels ½in. to ¾in. long, the bracts small; inflorescence 4ft. long, the central branches 6in. long, six to nine-flowered. Summer. *l.* dense, linear, 2ft. to 2½ft. long, 1in. to 1½in. broad, obscurely plicate, moderately firm, pungent-pointed, the margins horny, red-brown, entire or sometimes obscurely serrulated. Caudex simple, short. Mexico, 1859. Greenhouse. See Fig. 245. (R. H. 1859, p. 400.) SYNS. *Y. acuminata*, *Y. angustifolia*, *Y. longifolia*, *Y. mexicana*, *Y. stenophylla* (all of gardens).

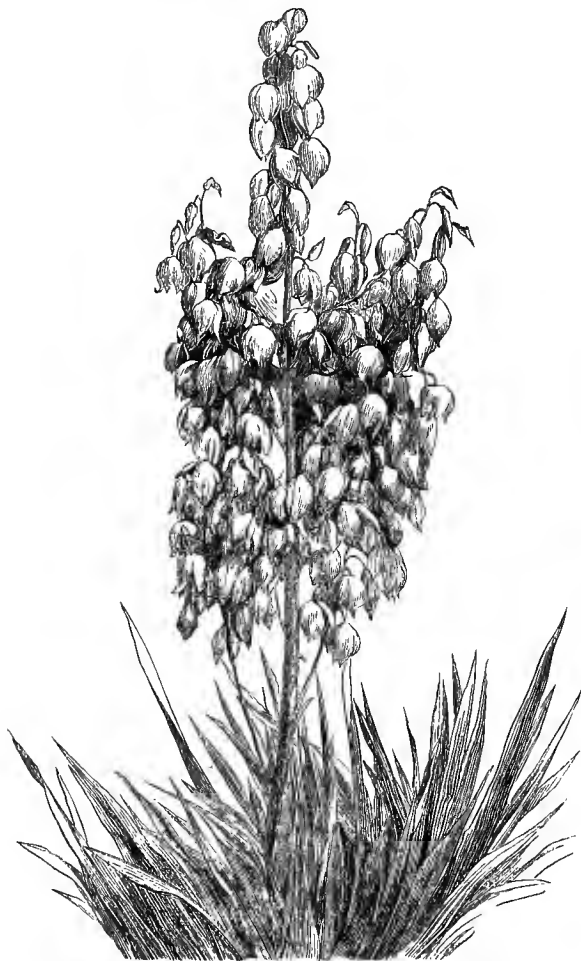


FIG. 246. YUCCA FLEXILIS ENSIFOLIA.

**Y. f. ensifolia** (sword-leaved).\* *fl.*, perianth slightly tinged with red outside, 2in. long; peduncle rather shorter than the leaves. *l.* forty to eighty, nearly erect, pale green (at first slightly glaucescent), 2ft. to 2½ft. long, 1½in. to 1½in. broad. Stem slender, sometimes 4ft. to 5ft. high. 1870. See Fig. 246. SYN. *Y. ensifolia* (Ref. B. 318).

**Y. f. falcata** (sickle-shaped). *fl.*, perianth white, slightly tinged with green on the outside, 2in. to 2½in. long; panicle rhomboid, rather loose, 2ft. long; peduncle 1ft. long. *l.* 100 to 150, green, straight, 2ft. long, 1½in. to 1½in. broad. Plant nearly stemless.

**Y. f. nobilis** (noble). *l.* sixty to eighty, nearly straight, 1ft. to

**Yucca**—continued.

1½ft. long, 1½in. to 1½in. broad, concave on the face, the margins horny, pale or red-brown; young ones very glaucescent.

**Y. f. semi-cylindrica** (half-cylindrical). *l.* forty to fifty, 1½ft. to 2ft. long, nine to ten lines broad, pale green (at first slightly glaucescent), the outer ones recurved, channelled above from base to apex, the margins red-brown. 1870.

**Y. fragillifolia** (fragile-leaved). A form of *Y. baccata*.

**Y. funifera** (cord-bearing). *l.* not numerous, ensiform, 6ft. to 7ft. long, thick, rigid, dingy-green, striolated, the margins furnished with robust, tenacious processes, often 10in. to 12in. long. Mexico, about 1866. Greenhouse. Perhaps a variety of *Y. Tre-culeana*.

**Y. Ghiesbreghtii** (Ghiesbreght's). A garden synonym of *Y. guatemalensis*.

**Y. gigantea** (gigantic). *fl.*, perianth white, 3in. to 3½in. long; panicle 2ft. to 2½ft. long, with twelve to fifteen branches, the central ones nearly 1ft. long, eight to ten-flowered. Summer. *l.* ensiform, straight, spreading, shining-green, 4ft. to 5ft. long, 3in. to 3½in. broad, acuminate, pungent-pointed, the margins whitish; lower ones scarcely recurved. Stem (in gardens) simple, slender, 3ft. to 4ft. high. Mexico (?), 1859. Greenhouse.

**Y. glauca** (glaucous).\* *fl.*, perianth white, broadly campanulate, the segments oblong, 1½in. long; lower pedicels five to six lines long; bracts small, lanceolate; panicle rhomboid, 2ft. to 3ft. long, the branches ascending, glabrous; peduncle 3ft. long. Summer. *l.* twenty-five to thirty, dense, ensiform, 1½ft. long, 1½in. to 1½in. broad, the young ones slightly glaucous, somewhat pungent at apex, with very narrow, red-brown, entire or slightly filamentose margins, the outer ones recurved. North America, 1814. Plant stemless, half-hardy. (B. M. 2662; Ref. B. 315.)

**Y. glaucescens** (glaucescent). A form of *Y. filamentosa*.

**Y. gloriosa** (glorious).\* Mound Lily. *fl.*, perianth tinged with red outside, campanulate, 1½in. to 2½in. long, the segments oblong, acute; pedicels four to twelve lines long; bracts small, lanceo-

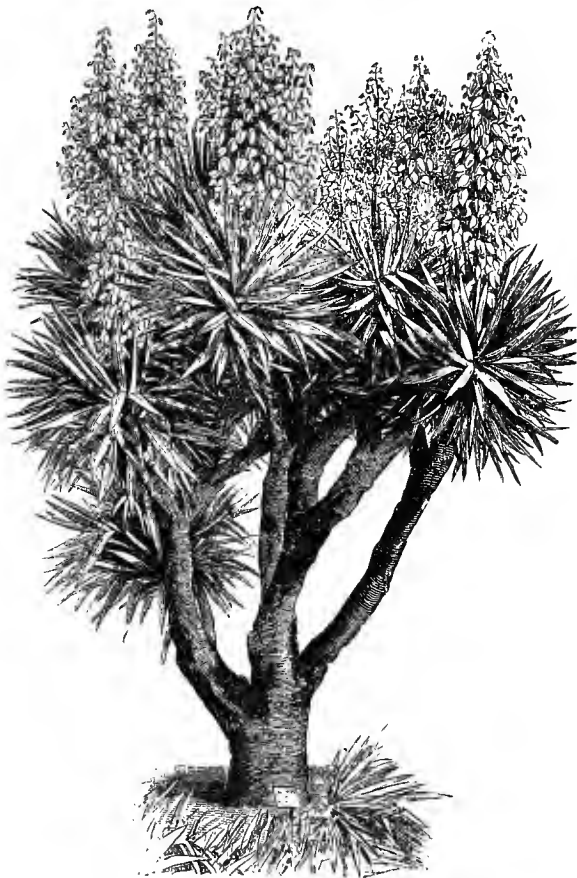


FIG. 247. YUCCA GLORIOSA.



**Yucca**—*continued*.

late; panicle rhomboid, rather dense, 4ft. to 6ft. long, with erecto-patent, glabrous or pubescent branches, the lower ones 1ft. to 1½ft. long; peduncle elongated, furnished with reduced leaves. July. *l.* 100 or more in a dense rosette, 1ft. to 3ft. long, 2in. to 3in. broad, rigid, erect, obscure-green, slightly glaucescent, somewhat concave on the face and scabrous at back, pungent-pointed, the narrow, red-brown margins entire, or in young forms obscurely serrulated. Stem when old 4ft. to 6ft. high, simple or branched. United States, 1596. See Fig. 247. (B. M. 1260; Ref. B. 320.)

**Y. g. acuminata** (taper-pointed). *fl.* fewer; perianth 1½in. to 2in. long; panicle smaller. *l.* fifty to sixty, 6in. to 2ft. long, 1½in. to 1¾in. broad, green, straight, acuminate. 1800. Nearly stemless. SYN. *Y. acuminata* (Ref. B. 316; S. B. F. G. 195). *Y. patens* is a similar form, with more numerous, broader, and more glaucescent leaves.



FIG. 248. YUCCA GLORIOSA RECURVIFOLIA.

**Y. g. Ellacombei** (Ellacombe's). *fl.*, perianth segments acuminate, 2½in. to 3in. long; lower pedicels 1in. to 1½in. long. *l.* forty to fifty, nearly straight, 2ft. to 2½ft. long, 1½in. to 1¾in. broad, concave on the face, at length smooth. Nearly stemless. SYN. *Y. Ellacombei* (Ref. B. 317).

**Y. g. medio-striata** (middle-striped). *l.* having a broad, whitish-green band down the centre on each side. 1880. (F. d. S. 2393-4.)

**Y. g. minor** (lesser). *fl.*, perianth 1½in. long; pedicels short; inflorescence 3ft. to 4ft. long. *l.* straight, 1ft. to 1½ft. long, 1½in. to 1¾in. broad. Dwarfier than the type. (Ref. B. 319.)

**Y. g. obliqua** (oblique). *l.* glaucous, 1½in. to 2in. broad, oblique, bending. 1808.

**Yucca**—*continued*.

**Y. g. plicata** (plaited). *fl.*, perianth 2in. long; panicle large. *l.* slenderer than in the type, but straight, much plaited, 1½ft. to 2½ft. long, 2in. to 2½in. broad, slightly scabrous at back.

**Y. g. pruinosa** (pruinose). *l.* seventy to eighty, straight, nearly flat in the middle, 2ft. to 2½ft. long, fifteen to sixteen lines broad, glaucescent. Nearly stemless.

**Y. g. recurvifolia** (recurved-leaved).\* *fl.*, perianth segments more narrowed at apex than in the type. *l.* 100 to 160, weaker than in the type, 2ft. to 3ft. long, the outer ones much recurved, less pungent at apex, flat and obscurely plicate in the middle above, concave only just above the base and below the apex; young ones glaucous. Stem short, often branched. 1794. See Figs. 248 and 249. SYNS. *Y. japonica* (of gardens), *Y. pendula* (R. H. 1859, p. 490), *Y. recurva*, *Y. recurvifolia* (Ref. B. 321). The garden form *foliis-variegatis* has a pale greenish-red stripe down the centre. 1833. (I. H. 1883, 475.)

**Y. g. rufocincta** (reddish-girdled). *l.* slightly recurved, sub-glaucescent, 2in. broad, smooth on both sides, with clearly-defined, reddish-brown margins. 1816. Nearly stemless.



FIG. 249. YOUNG PLANT DEVELOPED FROM ROOT CUTTING OF YUCCA GLORIOSA RECURVIFOLIA.

**Y. g. superba** (superb). *fl.* larger than in the type; panicle branches much spreading. *l.* broad and straight. Trunk at length 10ft. high. (A. B. R. 473, under name of *Y. gloriosa*.)

**Y. g. tortulata** (slightly-twisted). *l.* about forty, straight, glaucescent, 1½in. to 1¾in. long, fourteen to fifteen lines broad, often oblique, flexuous. 1873. Stemless.

**Y. guatemalensis** (Guatemala). *fl.*, perianth white, 2½in. to 3in. long, the segments oblong-lanceolate, acute, ¾in. to 1in. broad, the outer ones broader; pedicels ¾in. to 1½in. long; bracts white, scarious; panicle dense, rhomboid, 2ft. to 3ft. long, the central branches 6in. long; peduncle very short. Summer. *l.* fifty or more, loosely disposed, ensiform, 2ft. to 3ft. long, 2in. to 3in. broad, shining-green, scarcely pungent at apex, the whitish margins obscurely serrulated; upper ones ascending, much

**Yucca**—continued.

recurved. Stems sometimes 15ft. to 20ft. high, usually simple and tuberous at base. Mexico and Guatemala, 1873. Habit of *Y. aloifolia*. (Ref. B. 313.) SYNS. *Y. Ghiesbreghtii* and *Y. Roezii* (of gardens).

**Y. japonica** (Japanese). A garden synonym of *Y. gloriosa recurvifolia*.

**Y. laevigata** (smooth). A garden synonym of *Y. Peacockii*

**Y. lineata-lutea** (yellow-lined). A form of *Y. aloifolia*.

**Y. longifolia** (long-leaved). A synonym of *Y. flexilis*.

**Y. lutescens** (yellowish). A synonym of *Y. rupicola*.

**Y. macrocarpa** (large-fruited). *fl.*, panicle sub-sessile, with lanceolate, white, fleshy bracts. *fr.* pale yellowish, cylindrical, obtuse, not marked by any ridges, pulpy, 4in. to 6in. long, 6in. to 7in. in circumference, of a pleasant, sweetish, acidulous taste. *l.* spreading, sharp-pointed, concave, with entire margins. Trunk 1ft. to 4ft. high. Santa Rita Mountains, Arizona. This species is closely allied to *Y. baccata*.

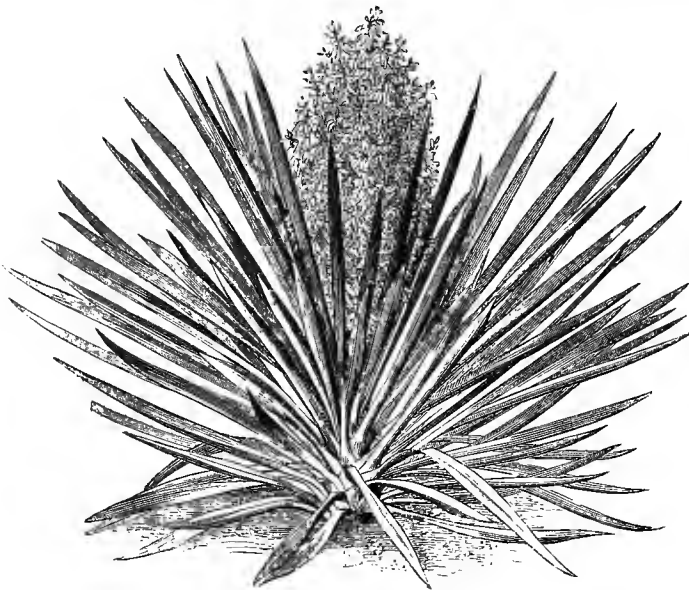


FIG. 250. YUCCA TRECULEANA.

**Y. mexicana** (Mexican). A synonym of *Y. flexilis*.

**Y. nobilis** (noble). A form of *Y. flexilis*.

**Y. obliqua** (oblique). A form of *Y. gloriosa*.

**Y. orchioides** (Orchis-like). A form of *Y. filamentosa*.

**Y. o. major** (greater). A synonym of *Y. filamentosa antverpensis*.

**Y. Parmentieri** (Parmentier's). A synonym of *Furcraea Bedinghausii*.

**Y. patens** (spreading). A form of *Y. gloriosa*.

**Y. Peacockii** (Peacock's). *l.* about 100 (forming a dense rosette 3ft. in diameter), straight, linear, 1½in. to 1½in. long, lin. broad, obscure-green, smooth and channelled on the face, rounded and slightly scabrous at back, pungent-pointed, the margins entire, reddish-brown. Mexico (?), 1879. Greenhouse. SYN. *Y. laevigata* (of gardens).

**Y. pendula** (pendulous). A synonym of *Y. gloriosa recurvifolia*.

**Y. periculosa** (dangerous). A form of *Y. baccata*.

**Y. polyphylla** (many-leaved). A synonym of *Y. constricta*.

**Y. pruinosa** (pruinose). A form of *Y. gloriosa*.

**Y. puberula** (puberulous). A form of *Y. filamentosa*.

**Y. purpurea** (purple). A form of *Y. aloifolia*.

**Y. quadricolor** (four-coloured). A form of *Y. aloifolia*.

**Y. recurva** (recurved). A synonym of *Y. gloriosa recurvifolia*.

**Y. recurvifolia** (recurved-leaved). A form of *Y. gloriosa*.

**Y. revoluta** (revolute). A garden synonym of *Y. Treculeana*.

**Y. Roëzii** (Roëz's). A garden synonym of *Y. guatemalensis*.

**Y. rufocincta** (red-girdled). A form of *Y. gloriosa*.

**Yucca**—continued.

**Y. rupicola** (rock-loving). *fl.*, perianth white, slightly greenish externally, 2in. to 3in. long, the segments oblong, acute, nine to fourteen lines broad; pedicels ½in. to ¾in. long; bracts small, lanceolate; panicle loose, with ascending branches, the lower ones 6in. long; peduncle 3ft. long, furnished with reduced leaves. Summer. *l.* dense, ensiform, 1½ft. to 2ft. long, ¾in. to 1½in. broad, often twisted, pungent-pointed, smooth above, slightly scabrous at back, with pale, serrulated margins. Texas. Plant stemless. SYNS. *Y. contorta* and *Y. tortilis* (of gardens), *Y. lutescens*.

**Y. scabrifolia** (scabrid-leaved). A form of *Y. baccata*.

**Y. semi-cylindrica** (half-cylindrical). A form of *Y. flexilis*.

**Y. stenophylla** (narrow-leaved). A synonym of *Y. flexilis*.

**Y. striata** (straight). A form of *Y. angustifolia*.

**Y. superba** (superb). A form of *Y. gloriosa*.

**Y. tenuifolia** (slender-leaved). A form of *Y. aloifolia*.

**Y. Tonelliana** (Tonel's). A synonym of *Furcraea Bedinghausii*.

**Y. tortilis** (twisted). A garden synonym of *Y. rupicola*.

**Y. tortulata** (slightly-twisted). A form of *Y. gloriosa*.

**Y. Treculeana** (Trécul's).\* *fl.*, perianth white, campanulate, 1½in. to 2½in. long, the segments oblong, acute, five to six lines broad; lower pedicels 1½in. to 1½in. long; bracts white, as long as the pedicels; panicle dense, 2ft. to 4ft. long, the glabrous branches often 1ft. long; peduncle short. Summer. *l.* dense, ensiform, 2ft. to 4½ft. long, 2in. to 3½in. broad, coriaceous, dull green, scabrous, deeply concave on the face, rounded at back, pungent-pointed, the red-brown margins paler outside, at first obscurely serrulated; adults sometimes slightly filamentose. Stem 20ft. to 25ft. high, 1ft. to 2ft. in diameter, copiously branched. Texas and North Mexico, 1858. Greenhouse. See Fig. 250. (R. H. 1869, p. 406). SYNS. *Y. agavoides*, *Y. concava*, *Y. contorta*, *Y. cornuta*, *Y. revoluta*, *Y. undulata* (all of gardens). *Y. canaliculata* (B. M. 5201) is a form having small flowers, and deeply-channelled leaves about 2ft. long. 1858.

**Y. tricolor** (three-coloured). A form of *Y. aloifolia*.

**Y. undulata** (wavy). A garden synonym of *Y. Treculeana*.

**Y. variegata** (variegated). A form of *Y. aloifolia*.

**Y. Whipplei** (Whipple's). *fl.*, perianth white, tinged with green externally, the segments lanceolate, three to six lines broad; pedicels ascending, lin. to 1½in. long; bracts white, minute; panicle dense, oblong-lanceolate, the slender branches 6in. long; peduncle elongated, with many reduced leaves; inflorescence 4ft. to 12ft. long. Summer. *l.* 150 to 200, dense, rigid, straight, linear, 1ft. to 1½ft. long, four to six lines broad, green, glaucous-tinged, dilated at base, flat above, channelled at back, sub-triquetrous, pungent-pointed, the pale margins minutely serrulated. California and Arizona, 1876. Plant stemless or nearly so, stoloniferous, half-bardy. (G. C. n. s., vi., p. 197.)

**Y. W. violacea** (violet).\* A striking variety, with violet-tinted flowers. 1884. (R. H. 1884, p. 324.)

**YULAN.** See *Magnolia conspicua*.

**ZACINTHA** (so called from having been first discovered in the island of Zante, the ancient Zacynthe). ORD. *Compositae*. A monotypic genus. The species is a glabrous, divaricately-branched, hardy, annual herb, of simple culture.

**Z. verrucosa** (warted). *fl.* heads yellow, rather small; involucre narrow, the inner bracts folded, the outer ones spreading; receptacle flat, naked; florets all ligulate, truncate five-toothed at apex; achenes glabrous. Summer. *l.* radical ones lyrate; cauline ones few, alternate, amplexicaul, more entire. *h.* 6in. to 12in. Mediterranean region. (S. F. G. 820.)

**ZACINTHA** (of Vellozo). A synonym of *Clavija* (which see).

**ZALACCA** (said to be the name of this genus in the Moluccas). Sometimes spelt *Salacca*. ORD. *Palmae*. A genus comprising about eight species of stemless, stove Palms, with soboliferous roots; one is a native of Assam, and the rest inhabit the Malayan Archipelago. Flowers often pink, polygamo-monoecious or dioecious; spathes persistent, the lower ones sheathing the peduncle and branches, incomplete, the partial ones subtending the floriferous branchlets; spadices simple or fastigiate, branched, pendulous, the floriferous branchlets catkin-like, rather short, remote or clustered, sessile or pedunculate; bracteoles connate in a two-celled cup. Fruit globose, turbinate, or ovoid, one to three-seeded, usually beaked. Leaves elongated, equally pinnatisect; segments alternate, fastigate or equidistant, lanceolate or oblanceolate, straight or falcate, acuminate; rachis obtusely triangular, not produced into a spine; petioles slightly terete, armed with often spirally-disposed prickles. The best-known species are here described. The plants grown in some nurseries under the names of *Z. nitida* and *Z. Wagneri* perhaps represent distinct species, but so little is known about them that they cannot be described. The cultural directions given under *Cycas* are applicable to this genus.

**Z. Blumeana** (Blume's). A synonym of *Z. edulis*.

**Z. edulis** (edible). *fl.*, spadices drooping, long-branched, the males axillary, longer and more branched than the females; female catkins 2 in. to 3 in. long, thicker than the males. *fr.* fulvous-fuscescent, pyriform, 2½ in. long. *l.* copious, clustered, erect, clothed with long, often serrate prickles; pinnae linear-lanceolate, very long-acuminate, 1½ ft. to 2½ ft. long, 1½ in. to 2 in. broad, whitish beneath; petiole rather shorter than the rachis, and armed with robust prickles. Malay Archipelago, 1847. SYN. *Z. Blumeana*.

**Z. Wallichiana** (Wallich's). *fl.*, spadix axillary, many feet long, drooping or pendulous, long-branched; male catkins 1 in. to 2 in. long, the female ones cylindrical, 2 in. long. *fr.* ovate-pyriform, 1½ in. long, slightly acute. *l.* 18 ft. to 20 ft. long, clustered, nearly erect; pinnae fasciated in twos, threes, or fours, narrow-lanceolate, with a long and slender, cuspidate point, attenuated and reduplicate at base, flat, the older ones 1½ ft. long, 3 in. to 4 in. broad; petiole 4 ft. to 6 ft. long, armed with robust, fuscous prickles. India, &c., 1847. (G. C. 1873, p. 1803.)

**ZALUZANIA** (named after Adam Zaluziansky à Zaluzian, a physician of Prague, who published "Methodus Herbariæ" in 1602). Including *Chilophyllum* and *Ferdinanda* (in part). ORD. *Compositæ*. A genus embracing seven species of stove, greenhouse or half-hardy, Mexican shrubs or under-shrubs. Flower-heads yellow (or white), heterogamous, radiate, sometimes rather small, in leafy, corymbose panicles. *Ferdinanda eminens* is a tall, stove shrub. Flower-heads white, small, disposed in an ample panicle; involucre short, the narrow bracts in two or three series. Leaves opposite, petiolate, large, angular-lobed. *Podachnium paniculatum* is now the correct name of this plant. It thrives in a compost of loam and peat, and may be increased by cuttings, inserted in sand, under a glass, in heat.

**ZALUZIANSKIA** (named in honour of the same person as the preceding genus). SYN. *Nycterinia*. ORD. *Scrophularinæ*. A genus comprising about sixteen species of more or less viscous, greenhouse or half-hardy, South African, annual or perennial herbs or sub-shrubs. Flowers sessile, spicate; calyx shortly five-toothed, bilabiate or two-parted; corolla persistent, at length cleft to the base, the limb of five spreading, entire or bifid lobes; stamens often four. Lower leaves alternate; upper ones opposite, few-toothed; floral ones bract-like, entire. Three species have been introduced. All thrive in a mixture of sandy loam and peat. Seeds of *S. capensis* and *S. selaginoides* may be sown, in summer, in the open border. *S. lychnidea* may be increased by cuttings, or by divisions.

**Z. capensis** (Cape).\* *fl.* whitish; corolla slender, nearly 1½ in. long; spikes usually short and few-flowered, the central one usually acquiring a considerable length. Spring. *l.*, upper ones

**Zaluzianskia**—continued.

or all linear, few-toothed or quite entire, one-nerved, the margins and nerve usually ciliated. Stem erect, adpressedly villous. *h.* 6 in. to 12 in. Half-hardy annual. See Figs. 251 and 252.



FIG. 251. ZALUZIANSKIA CAPENSIS.

**Z. lychnidea** (Lychnis-like). *fl.* yellowish-white; corolla tube 1½ in. or rather more in length; spikes elongated. May to July. *l.* oblong-linear, few-toothed or entire, one-nerved, nearly glabrous; floral ones amplexicaul, broadly lanceolate or oblong, obtuse, few-toothed or entire, the margins and nerve ciliated. Branches adpressedly villous. *h.* 6 in. to 12 in. 1776. Greenhouse sub-shrub. SYNS. *Erinus lychnidea* (B. M. 2504; B. R. 748), *Nycterinia lychnidea* (S. B. F. G. ser. ii. 239).

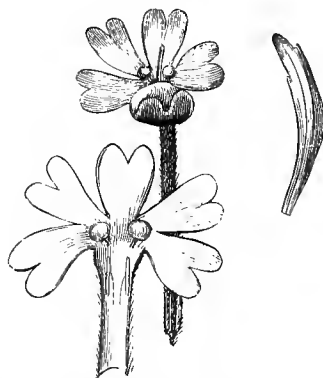


FIG. 252. ZALUZIANSKIA CAPENSIS, showing detached Flower, Leaf, and Corolla laid open to exhibit insertion of Stamens.

**Z. selaginoides** (Selago-like). *fl.* white, with an orange centre, fragrant at night; corolla nine to eleven lines long, the throat crowned with rigid pili; spikes interrupted at base. May. *l.* spatulate; lower ones obovate, on rather long petioles; upper ones oblong- or linear-spatulate; floral ones adnate to the calyx, dilated at base. *h.* 3 in. to 5 in. 1854. Half-hardy annual.

**ZAMIA** (from *zamia*, loss; a name given by Pliny to barren Pine cones, and hence applied by Linnæus to this genus, in allusion to the sterile appearance of the male fructification). ORD. *Cycadaceæ*. A genus comprising about thirty species of handsome, stove or greenhouse, perennial plants, resembling Palms and, in some particulars, Ferns; they are all natives of tropical America and the West Indies, one only extending up to the Southern

**Zamia**—continued.

United States. Leaves few, appearing one after another, pinnate; pinnae broad or narrow, entire or serrated; petioles smooth or spinulose. Cones glabrous or rarely furfuraceous, solitary or two or more together; males oblong-cylindrical, with many series of superposed, peltate scales, on thick footstalks; females similar, but larger and thicker. Caudex (sometimes a dwarf trunk) simple, lobed, or branched, smooth or scarred, naked, epigæous or nearly hypogæous. The species best known to cultivation are here described. They thrive in a mixture of equal parts of good loam and peat, with a little silver sand added, and prefer a position where they would be shaded from bright sunshine in summer, and a temperature not lower than 60deg. in winter. In summer, they should be freely watered, both at the root and overhead. When sick, it is a good plan to shake all the soil away from their roots, wash them carefully, cut away all decayed parts, and replot them in fresh soil. They should then be plunged in bottom heat, and watered carefully till new growth appears. Propagated by division in the cases where the stems are clustered; by seeds and offsets where division is not possible. Except *Z. integrifolia*, the North American species, all are stove plants.

**Z. amplifolia** (ample-leaved).\* *Z. erecta*; leaflets two pairs, broadly ovate-lanceolate, acuminate, glabrous, yellowish-green, 1 1/2 in. long, 3/4 in. to 4 in. broad, strongly ribbed on both sides; rachis angular; petioles 1 1/2 in. to 1 3/4 in. long, purplish, terete, puberulous, with scattered, minute prickles. Caudex oblong, obtuse, glabrous. Columbia, 1879. A handsome plant, probably now lost to cultivation.

**Z. angustifolia** (narrow-leaved). *Z. adults* glabrous; leaflets four to twenty on both sides, mostly alternate, narrow-linear, rather obtuse, 6 in. to 8 in. long, scarcely narrowed at base; petioles terete beneath, unarmed. *cones* 2 in. to 2 1/2 in. long; males reddish-tomentose, cylindrical; females thicker, obtusely cuspidate; peduncles erect, rufous-pubescent. Caudex ovoid-conical. West Indies.

**Z. calocoma** (beautiful-haired).\* *Z. 3 ft.* long, very slenderly pubescent; leaflets eighty on each side, alternate and opposite, the larger ones 4 in. long, long-linear, acuminate, slightly narrowed at base, parallel-nerved, the margins revolute; petioles 4 in. long, terete beneath. Trunk dwarf. Antilles. *Macrozamia calocoma* is now the correct name of this species.

**Z. Chigua** (Chigua). *Z. 4 ft.* long; leaflets alternate, very numerous, spreading, long-lanceolate, acuminate, obsoletely denticulate, glabrous, about sixteen-nerved; petioles thickly, and rachis sparsely, prickly. *cones*, males cylindrical, 5 1/2 in. to 7 1/2 in. long, cuspidate; females much larger, cuspidate. Trunk cylindrical, 8 in. high. Darien, 1847. *SYNS. Z. Lindleyi, Z. princeps, Aulacophyllum Ortigiesi.*

**Z. Fischeri** (Fischer's). *Z. leaflets* three to six on each side, 1 1/2 in. to 2 1/2 in. long, about 1/4 in. broad, the lower ones alternate, the upper ones opposite, lanceolate, acuminate, attenuated at base, slightly inequilateral, the upper margin argutely serrulated one-third to half its length; rachis 1 1/2 in. to 2 1/2 in. long, glabrous or nearly so, produced above the leaflets in a mucro; petioles nearly terete, 2 in. or more long. Central America, 1849. (G. C. n. s., xix., p. 213.)

**Z. Fraseri** (Fraser's). A garden synonym of *Macrozamia Fraseri*.

**Z. furfuracea** (scurfy).\* Jamaica Sago-tree. *Z. leaflets* ten to thirteen on each side, opposite or alternate, obovate-oblong or obversely lanceolate, spinulose-serrulated from the middle to the apex, serrated and sometimes unequally repand-lobed at the extremity, acute or obtuse, below densely, above and on the rachis and petioles slightly, scurfy; rachis almost unarmed; petioles prickly. *cones*, females yellow-scurfy, 2 in. to 4 in. long, ovoid-elongated. Trunk cylindrical. Mexico, 1691. (B. M. 1969; R. G. 932.)

**Z. Ghellinckii** (Ghellinck's). A synonym of *Encephalartos Ghellinckii*.

**Z. integrifolia** (entire-leaved). Jamaica Sago-tree. *Z. spreading*, glabrous; leaflets seven to sixteen on each side, alternate, rarely opposite, the larger ones 4 in. to 7 in. long, oblong or obovate-oblong, entire or obtusely serrulated at apex; petioles unarmed. *cones* slightly rufous-tomentose; males 2 1/2 in. long; females 3 1/2 in. long. Trunk short, globular or oblong. Southern United States, &c., 1758. Greenhouse. (B. M. 1851.)

**Z. Kickxii** (Kickx's). *Z. glabrous*; leaflets about twenty-four on each side, alternate or sub-opposite, nearly all spreading, the lower ones smaller, the middle ones 2 in. long, 1/4 in. broad, lanceolate-elliptic, the margins, especially the lower one, serrulated; rachis sub-terete; petioles slender, unarmed. *cones*, males cylindrical, elongated, acute, 2 in. long. Cuba.

**Zamia**—continued.

**Z. Leiboldii** (Leibold's). *Z. leaflets* fourteen to twenty-two on each side, truncate or acute at apex, opposite or alternate, twenty to twenty-five nerved; petioles semi-terete. Trunk 8 in. high. Mexico, 1843. (R. G. 928, under name of *Z. L. angustifolia*.)

**Z. Lindenii** (Linden's). *Z. lanceolate*, 6 ft. long, on elongated petioles; leaflets forty to forty-four on each side, sessile, glabrous, 8 in. long, elongated-lanceolate, somewhat falcate, dentate-serrated in the upper half. Trunk cylindrical, 3 ft. or more high. Ecuador, 1875. A stately plant. (I. H. 1875, 196.)

**Z. Lindleyi** (Lindley's). A synonym of *Z. Chigua*.

**Z. Loddigesii** (Loddiges'). *Z. leaflets* erecto-acumbent, long-lanceolate or linear-lanceolate, slightly narrowed at base, acuminate at apex, 7 1/2 in. long, slightly thickened on the margins, serrated from the middle (or nearly so) to the apex; rachis slightly spiny. Caraccas, 1844. (R. G. 926.)

**Z. media** (medium). A synonym of *Z. pumila*.

**Z. Miquelii** (Miquel's). A garden name for *Macrozamia Fraseri*.

**Z. montana** (mountain-loving). *Z. 4 ft.* to 5 ft. long, forming a terminal tuft; leaflets eight to ten pairs, 1 ft. or more long, 2 in. to 4 in. broad, oblanceolate to linear-oblanceolate, abruptly acuminate, with one prominent tooth and a few obscure ones; petioles dusky-tomentose at base, beset throughout with scattered prickles. Trunk 4 ft. to 5 ft. high, 9 in. thick. Columbia, 1882.

**Z. muricata** (rough). *Z. leaflets* six to eleven pairs, alternate and sub-opposite, oblong or obversely oblong or oblong-lanceolate, acuminate, obscurely spiny-serrulated from the middle to the apex; petioles terete, prickly. *cones* 3 1/2 in. to 4 in. long, cylindrical, sub-acute at apex; peduncles glabrous. Trunk glabrous. Central America, 1848.

**Z. obliqua** (oblique). *Z. unarmed*, glabrous or covered with a close pubescence; leaflets seven to ten on both sides, ovate-lanceolate, obtusely acuminate at apex, attenuated at base, about 8 in. long and nearly 3 in. broad. Trunk slender, attaining a height of 6 ft. to 7 ft. Columbia, 1878. (G. C. n. s., xvii., p. 461; I. H. 1877, 289.)

**Z. Ottonis** (Otto's). *Z. glabrous*, 1 ft. to 2 ft. long; leaflets nine to fourteen pairs, alternate and (the upper ones) opposite, oblong or obovate-lanceolate, obtuse, the larger ones 1 1/2 in. to 2 in. long, argutely serrulated towards the apex, especially on the lower margin; petioles unarmed. *cones* 1 1/2 in. long; males fuscous-pubescent, cylindrical; females thick, cuspidate; peduncles 1 1/2 in. long, clothed with fuscous and white pubescence. Caudex tuberous, fusiform, 2 1/2 in. long. Cuba.

**Z. picta** (painted).\* *Z. leaflets* spotted with white; petioles thicker and more pubescent than in *Z. muricata*, of which *Z. picta* was long considered a variety; it is, however, a much handsomer plant, very distinct from that species. Mexico.

**Z. prasina** (grass-green). *Z. leaflets* sixteen or seventeen pairs, oblanceolate-cuneate, denticulated towards the apex, bright grass-green above; petioles terete, slightly furrowed in front, and beset with a few white prickles. Honduras, 1881.

**Z. princeps** (princely). A synonym of *Z. Chigua*.

**Z. pumila** (dwarf). *Z. leaflets* eighteen to twenty on both sides, obovate-oblong, obtuse, entire or obsoletely serrulated, 2 in. to 2 1/2 in. long; petioles unarmed, scurfy-pubescent. *cones* 1 1/2 in. to 3 1/2 in. long, ellipsoid, obtuse. Florida and West Indies, 1812. Stove or greenhouse. (B. M. 2006.) *SYN. Z. media* (B. M. 1838).

**Z. pygmaea** (pigmy). *Z. 5 in.* to 8 1/2 in. long; leaflets three to ten pairs, opposite and alternate, obliquely sub-cuneate at base, oval-oblong or oval, the larger ones 1 1/2 in. long, serrated to the middle; petioles terete, unarmed, 2 1/2 in. long. *cones*, males 1 in. long, somewhat ovoid-globose, on long peduncles. Caudex growing underground. West Indies. Plant dwarf, highly glabrous. (B. M. 1741.)

**Z. Roëzlii** (Roëz's). *Z. 6 1/2 ft.* long, forming an elegant crown; leaflets 12 in. to 16 in. long, linear, acute, falcate, glabrous, shining, longitudinally furrowed. *cones*, females large, cylindrical, obtuse. Trunk thick. New Grenada, 1873. (I. H. 1873, 133-4.)

**Z. Skinneri** (Skinner's). *Z. leaflets* usually four pairs, opposite or alternate, oblong, acute at both ends, coriaceous, shining, spiny-serrulated from the middle to the apex, the larger ones 1 ft. long, 3 1/2 in. broad; rachis and petioles prickly. *cones*, males three or four, aggregated, elongated-cylindrical, shortly pedunculate, 6 in. long, ferruginous-pubescent. Central America, 1851. (B. M. 5242; F. d. S. 2212.) *SYN. Aulacophyllum Skinneri*.

**Z. tonkinensis** (Tonkin). *Z. pinnatifid*, slightly recurved, glabrous, of a beautiful green; leaflets sessile, lanceolate, acuminate at apex, the margins undulate; petioles cylindrical, woolly, furnished with very robust spines. Trunk slender, cylindrical, erect, wholly clothed with large, round, fuscous scales. Tonkin. (I. H. 1885, 547.)

**Z. villosus** (villous). A synonym of *Encephalartos villosus*.

**Z. Wallisii** (Wallis').\* *Z. solitary*, pinnate; leaflets few, lanceolate, plaited, 1 ft. long; petioles reddish, prickly. Trunk short and fleshy. New Grenada, 1875. This plant is allied to *Z. Skinneri*.

**ZAMIOCULCAS** (from *Zamia*, a cycadaceous genus, and *Culcasia*, belonging to the Aroids; both of which the present plants are supposed to resemble). Including *Gonatopus*. ORD. *Aroideæ* (*Araceæ*). A small genus (two species) of stove, herbaceous perennials, natives of Eastern tropical Africa. Flowers dense; spathe tube convolute, sub-globose, the lamina lanceolate or boat-shaped, horned at apex; spadix sessile, cylindrical, shorter than the spathe, inappendiculate. Leaves many, on thick petioles, imparipinnate with six to eight pairs of alternate pinnae, or bipinnate with opposite pinnae and pinnules; petioles very shortly sheathing at base. These plants thrive in a compost of sandy loam, leaf mould, and small pieces of charcoal, and require a moist atmosphere. Propagation may be effected by division of the root. "Young plants may also be obtained from the leaflets after they have disarticulated from the rachis, as follows: Place some leaflets upon some soil, which must be kept damp; in a few days, the basal ends of the leaflets commence to swell, and each forms, after a short time, a small tuber. The tuber, with the leaf attached, may then be planted in a small pot, but should only be just covered with earth; roots and leaf-buds quickly form, and soon a young plant is established" (N. E. Brown).

**Z. Boivini** (Boivin's). *fl.*, spathe 6in. long, the lamina dirty yellowish-green inside, lurid yellowish-green externally, darkly nerved and striated; spadix equalling the spathe, the female portion 1in. long, the male 4in. long, yellow, terete. *l.* solitary, radical, erect, 2ft. to 3ft. long, triangular-ovate, triternately pinnate; pinnae opposite, ovate-lanceolate, acuminate, sessile or shortly petiolulate; petioles as thick as the little finger. Rhizome short, dilated. 1873. (B. M. 6026.) SYN. *Gonatopus Boivinii*.

**Z. Loddigesii** (Loddiges). *fl.*, spathe green, thick, the lamina about 2in. long; spadix greenish-yellow, 1½in. to 2in. long, constricted in the middle; scape very short, stout. June. *l.*, pinnae 3in. to 6in. long, alternate, deciduous, obovate or elliptic-lanceolate, shortly petiolulate or sub-sessile; petioles about 2ft. long, terete, clavate at base. Rhizome short, horizontal, giving off large, white, sessile tubers. 1828. (B. M. 5985.) SYN. *Caladium zamioefolium* (L. B. C. 1408).

**ZANNICHELLIA** (named after John Jerome Zannichelli, 1662-1729, a Venetian botanist). Horned Pondweed. ORD. *Naiadaceæ*. A small genus (one or several species) of hardy, slender, aquatic, annual herbs, inhabiting temperate and tropical regions. Flowers minute, solitary or in pairs, axillary. Leaves usually opposite, linear, submerged. *Z. palustris* is a British plant; it has no horticultural value.

**ZANONA PALM.** A common name for *Socratea exorrhiza* (which see).

**ZANTEDESCHIA** (of Koch). A synonym of *Schismatoglottis* (which see).

**ZANTEDESCHIA** (of Sprengel). Synonymous with *Homalonema* and *Richardia* (which see).

**ZANTE WOOD.** The wood of *Chloroxylon Swietenia* and *Rhus Cotinus*.

**ZANTHORHIZA.** A synonym of *Xanthorrhiza* (which see).

**ZANTHOXYLÆ.** A tribe of *Rutacæ*.

**ZANTHOXYLUM** (from *xanthos*, yellow, and *xylon*, wood; alluding to the colour of the roots). Sometimes spelt *Xanthoxylon*. Prickly Ash; Toothache-tree. SYN. *Pterota*. Including *Blackburnia* and *Fagara*. ORD. *Rutacæ*. A genus embracing about eighty species of stove, greenhouse, half-hardy, or hardy shrubs or trees, often armed with stout prickles, inhabiting tropical and sub-tropical regions. Flowers often white or greenish, small, in axillary or terminal, pedunculate, broad or narrow cymes; calyx three to five-cleft, rarely obsolete; petals three to five, rarely wanting; stamens three to five. Fruit of one to

*Zanthoxylum*—continued.

five fleshy carpels, often aromatic or strongly scented. Leaves alternate, trifoliate or unequally pinnate; leaflets opposite or alternate, entire or crenate, often oblique, dotted. A selection of the introduced species is here given. For culture, see *Zizyphus*.

**Z. alatum** (winged). *fl.* apetalous; panicles loose, sparingly branched. Spring. *l.* 1½in. to 5in. long; leaflets two to six pairs, lanceolate, obtusely acuminate, glabrous beneath; petiole and rachis usually broadly winged. Prickles often vertically flattened on the trunk and branches. India. Half-hardy shrub or small tree.

**Z. americanum** (American). Common Toothache-tree. *fl.* apetalous, in axillary umbels. March and April. *l.*, leaflets nine or eleven, ovate, obscurely serrated, equal at base; petioles round, and devoid of prickles; stipules replaced by prickles. *h.* 12ft. to 15ft. North America, 1740. Hardy tree.

**Z. aromaticum** (aromatic). *fl.* greenish-white; panicles terminal and axillary, glabrous, verrucose, 3in. to 5in. in diameter. April. *l.*, leaflets six to twelve-jugal, elliptic or oblong, crenate, with the crenatures broadly truncate, petiolulate, glabrous, glandular beneath. Prickles short, subulate, or wanting. *h.* 20ft. Jamaica, 1824. Stove tree.

**Z. Blackburnia** (Blackburnia). *fl.* white; petals imbricated; panicles axillary or terminal, loose, shorter than the leaves. May. *l.* pinnate, with a compound petiole of 4in. to 8in.; leaflets three to nine, very obliquely ovate, shortly acuminate, usually 2in. to 3in. long, petiolulate. *h.* 6ft. Australia, 1829. Greenhouse shrub or small tree. SYN. *Blackburnia pinnata*.

**Z. clava-Herculis** (Hercules' Club). Southern Prickly Ash. *fl.* greenish; panicles terminal and axillary, pubescent, 2in. to 4in. in diameter. April. *l.*, leaflets five to ten-jugal, lanceolate-oblong, pointed, quite entire or minutely serrated, sub-sessile, glabrous above, puberulous along the nerves or glabrate beneath. *h.* 20ft. to 50ft. West Indies, 1824. Stove tree.

**Z. nitidum** (shining). *fl.* greenish-white; racemes axillary, fasciated. May. *l.* imparipinnate, two or three-jugal; leaflets oblong, shining, remotely glandular-crenate, elongated and emarginate at apex, the midrib (as well as the petioles and branches) prickly. *h.* 10ft. China, 1823. Greenhouse shrub. (B. M. 2538.)

**Z. piperitum** (Pepper-like). Chinese or Japanese Pepper. *fl.* white. September. *l.*, leaflets oblong, unequal at base, crenate; petioles subulate, jointed; prickles stipular. *h.* 10ft. Japan, 1773. Half-hardy shrub. The small, globose, rugose fruits of this species are called Japan Pepper. SYN. *Fagara piperita*.

**Z. Pterota** (Pterota). Bastard Ironwood. *fl.* greenish, in axillary clusters, single or by pairs; stamens four. August. *l.*, leaflets seven to nine, ½in. to 1in. long, obovate, crenate above the middle, sessile; petioles winged, jointed. Branches zigzag, armed with short, curved prickles. *h.* 10ft. South Florida, &c., 1768. Half-hardy tree.

**Z. spinifex** (thorny). *fl.* white, in a short glomerule. July. *l.*, leaflets one to three-jugal, oval or spatulate, emarginate or blunt, quite entire, ½in. to 1in. long, glabrous, leathery, bitubercled at the base beneath, devoid of pellucid dots; petioles unarmed. Stipular prickles straight. West Indies, 1825. A low, tortuous, leafy, stove shrub. SYN. *Fagara microphylla*.

**ZAPANIA.** Included under *Lippia* (which see).

**ZARA.** A synonym of *Pistia* (which see).

**ZARABELLIA** (of Necker). A synonym of *Berkheya* (which see).

**ZAUSCHNERIA** (named after H. Zauschner, a German botanist). ORD. *Onagraceæ*. A monotypic genus. The species is a handsome, small, half-hardy shrub, thriving in any light, but not on heavy soil. It may be multiplied by cuttings, made from young side shoots, in September, inserted in pots of sandy soil, and placed in a frame. If wintered in a cool house or frame, the young plants may be transferred to the open ground in spring, where they will grow and flower profusely the summer and autumn following. Division of old plants in spring, and seeds, are also available methods of increase. The latter should be sown, about March, on a gentle hotbed. In sheltered places and warm situations, this desirable plant proves itself sufficiently hardy to live outside in winter; but it is safer to propagate a young stock annually than to trust too much to its hardiness.

**Zauschneria**—continued.

**Z. californica** (Californian)\* Californian Fuchsia; Humming-bird's Trumpet. *fl.* bright red, in loose spikes terminating the branches, large, erect, spreading, and with small, leafy bracts; calyx coloured, much produced, funnel-shaped, globose-inflated at base, the segments spreading; petals four, obcordate, or rather deeply two-cleft, rather longer than the calyx lobes; stamens eight, slightly exserted. Summer and autumn. *l.* crowded, linear-lanceolate, narrow, entire or denticulate, sessile, canescently pubescent, the lower ones opposite, those of the branches alternate. *h.* 1 ft. California and Mexico, 1847. (F. d. S. 404; P. M. B. xv. 195.)

**Z. c. latifolia** (broad-leaved). *fl.* rather smaller; calyx dull red. *l.* rather broader, and, as well as the branches, villous-canescens. (B. M. 4483.)

**ZEÄ** (*Zea* or *Zeia* was the old Greek name for Spelt, or some similar common Cereal, and is found as far back as Homer). **SYN.** *Mays*. **ORD.** *Gramineæ*. A monotypic genus. The species is a well-known, tall, half-hardy Grass. Maize, probably, ranks next to Rices in its importance as a food-plant; it is very largely cultivated throughout

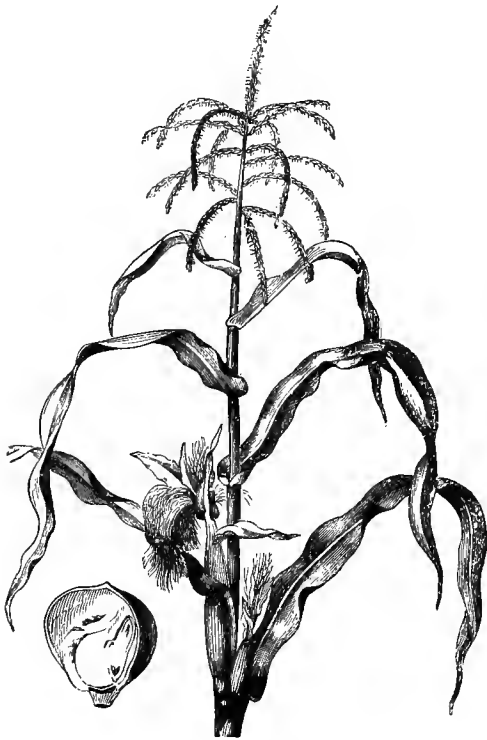


FIG. 253. UPPER PORTION OF PLANT OF *ZEÄ MAYS*, showing axillary Female and terminal Male Inflorescences; also Longitudinal Section through Seed.

the warmer regions of the globe, and is imported into England in immense quantities. A fine flour, known as Corn Flour and Maizena, is prepared from the grain of *Z. Mays*, and is largely employed in the making of light puddings, custards, &c. Numerous varieties are grown in gardens, most of them sufficiently hardy to endure the open air. They thrive in any fairly good soil, and may be increased by seeds.

**Z. Mays** (Maize)\* Guinea or Turkey Wheat; Indian Corn; Maize; Mealies. *fl.*, spikelets unisexual, monoecious, the males in a terminal panicle, two-flowered, the females in large, axillary spikes, longitudinally many-seriate, one-flowered. June. *fr.*, spikes (known as "cobs") long and thick, sheathed with im-

**Zea**—continued.

bracted pales. *l.* ample, entire, broad, flat. *h.* 3 ft. Probably of American origin, 1562. See Fig. 253. (B. M. Pl. 236.) *gracillima* is a variety of very graceful habit.



FIG 254. *ZEÄ MAYS VARIEGATA*.

**Z. M. variegata** (variegated)\* This differs from the type in its leaves being striped with white. It is an exceedingly ornamental plant. See Fig. 254.

**ZEÄRA PLANT.** A common name for *Calathea zebrina* (which see).

**ZEÄRA WOOD.** A common name for *Myrtus fragrans* and *Guetarda speciosa* (which see).

**ZEÄRINA** (the leaves are striped in a zebra-like manner). **ORD.** *Commelinaceæ*. A small genus (two species) of stove or greenhouse, loosely decumbent, pendulous or climbing, branched herbs, natives of Mexico. Flowers rather small, shortly pedicellate; calyx trifid, or bifid with one lobe broader; corolla lobes spreading; stamens six; cymes sessile in a spathe, fascicle-like, few or many-flowered; spathes on terminal peduncles. Leaves ovate-lanceolate. *Z. pendula* forms a good basket plant, and is also useful for covering the earth in very large pots or tubs, or as an edging in suitable places. It thrives in a light, rich soil, and may be very quickly increased by cuttings.

**Z. pendula** (pendulous)\* *fl.*, calyx tube whitish; corolla tube white, the segments rose-purple, ovate, obtuse; inflorescence glomerate. Summer. *l.* 1½ in. long, ¾ in. to 1 in. broad, sub-sessile, ovate-oblong, acute, scarcely acuminate, or somewhat obtuse, green, striped with white and sparsely pubescent above, purplish and densely pubescent beneath. Stems decumbent, branched, glabrous or pilose on one side. 1849. (R. H. 1855, p. 141.) **SYNS.** *Cyanotis vittata*, *Tradescantia tricolor*, *T. zebrina*. There is also a tricoloured variety, in which the whitish portion of the upper surface of the leaves is suffused with red.

**ZEDOARY, ROUND.** See *Curcuma Zedoaria*.

**ZEÄNERIA** (named in memory of Joseph Zehner, a botanical artist of Vienna). **SYN.** *Pilogyne*. **ORD.** *Cucurbitaceæ*. A genus embracing about fifteen species of stove



**Zehneria**—continued.

or greenhouse, prostrate or climbing herbs, with perennial roots; one is found in Norfolk Island, another in Peru, and the rest inhabit tropical and South Africa and Asia. Flowers small, dioecious, rarely monoecious; males fasciated, racemose, or corymbose, with three, rarely four or five, stamens; females solitary, fasciated, or corymbose, with three rudimentary stamens; calyx minutely five-toothed or five-lobed; corolla rotate, five-parted. Fruit small, baccate, shortly pedunculate. Leaves angularly toothed or lobed, often membranous. Tendrils simple. Only two species have been introduced. For culture, see **Gourds**.

**Z. hastata** (halbert-shaped). *l.* very ornamental, of a firm texture, lively green in colour, the veins being bordered with silvery-white, ovate, sub-orbicular, oblong, or narrow-lanceolate, glabrous or rarely slightly scabrous below, usually acute or acuminate at apex. Java, 1866. A handsome, tuberous-rooted climber. Its proper name is now *Melothria heterophylla*.

**Z. snavis** (soft). *l.* white-dotted and scabrous above, pilose, shortly hirsute, or scabrous beneath, cordate-ovate, angular or somewhat three to five-lobed, emarginate at base, the margins slightly and remotely denticulate. South Africa. Greenhouse. *Melothria punctata* is now the correct name of this plant.

**ZENOBIA** (so called after the famous Empress of Palmyra, who lived in the third century). ORD. *Eriaceae*. A monotypic genus. The species is a hardy, highly glabrous, often glaucous shrub, with terete branchlets. It thrives in a compost of sandy loam and peat. Propagation may be effected by seeds, or by layers.

**Z. speciosa** (showy).\* *fl.* in umbel-like fascicles from axillary buds, mostly racemose on naked branches of the preceding year; calyx lobes short, triangular; corolla white, five-lobed; pedicels drooping. Summer. *l.* coriaceous, but deciduous, oval or oblong, 1 in. to 2 in. long, commonly crenulated or sparsely serrulated, reticulate-veined. *h.* 2 ft. to 4 ft. South United States, 1800. (S. B. F. G. ser. ii. 330.) SYNS. *Andromeda cassinefolia* (B. M. 970), *A. speciosa* (L. B. C. 551).

**Z. s. pulverulenta** (powdery).\* A white, glaucous form. (G. C. n. s., xx., p. 109; Gn. xxiv., p. 572.) SYNS. *Andromeda dealbata* (B. R. 1010); *A. pulverulenta* (B. M. 667).

**ZEPHYRANTHES** (from *zephyros*, the west wind, and *anthe*, a flower; a fanciful name given by Herbert). Flower of the West Wind; Zephyr Flower. Including *Habranthus* (in part) and *Pyrolirion*. ORD. *Amoryllideae*. A genus comprising nearly thirty species of pretty, stove, greenhouse, or hardy, bulbous plants, inhabiting the warmer parts of America; one species being found in Western tropical Africa. Flower always solitary in a spatheaceous bract, which is entire or bifid at apex and tubular at base, pedicellate or rarely sessile, erect or slightly declinate; perianth pink, white, purplish, or yellowish, sometimes various-coloured in the same species, funnel-shaped, the tube very short or more or less elongated, enlarged above; lobes equal or slightly unequal, erecto-patent above; stamens affixed to the throat, equal, or three rather smaller; scape elongated, fistular. Leaves few, linear or loriform, appearing with or after the flowers. The species best known to gardeners are described below. The plants grow and flower in summer, and rest in winter. They should be grown in a sunny frame, or on a shelf in a greenhouse during warm weather. They must be protected from frost in winter; a. dry shelf in a heated greenhouse or shed being the best position for them. Some of the kinds may be left outside if planted in a dry, sunny border. They require a compost of turfy loam, with a little rotten manure and sand; and should be repotted about every two years. Propagated by separating the offset bulbs; or by seeds, which are freely produced.

**Z. Andersoni** (Anderson's).\* *fl.* perianth golden or copper-coloured, fuscous-reddish at base, striated outside, 1½ in. long; pedicel 1½ in. or more long; spathe divided above; scape reddish, 3 in. to 4 in. long. May. *l.* narrow-linear, acute, green or slightly glaucous, 5 in. to 6 in. long. Monte Video, 1829. Greenhouse or half-hardy. SYN. *Habranthus Andersoni* (B. R. 1345; L. B. C. 1677; S. B. F. G. ser. ii. 70). *Z. A. aureus* and *Z. A. cupreus* have respectively golden and coppery flowers.

**Zephyranthes**—continued.

**Z. A. texana** (Texan). *fl.* perianth yellow; segments round, obtuse. SYN. *Habranthus Andersoni texanus* (B. M. 3596).

**Z. Atamasco**.\* *Atamasco Lily. fl.* perianth white (when young, suffused with white, purple, or flesh-colour), the segments recurved, lanceolate, acute; scape terete, 6 in. to 12 in. long. May. *l.* linear, slightly succulent, channelled, glabrous, nearly 1 ft. long. Virginia, &c., 1629. Hardy. (L. B. C. 1899.) SYN. *Amoryllis Atamasco* (B. M. 239).

**Z. candida** (white).\* Peruvian Swamp Lily. *fl.* inodorous, erect, shortly pedicellate; perianth white, greenish at base, the segments sub-equal, ovate, obtuse, 1 in. long; spathe purplish, much shorter than the pedicel; scape erect or declinate, longer or shorter than the leaves. September. *l.* fasciated, linear, flat, highly glabrous, fleshy, of a pleasing green, 2 in. to 5 in. long. Buenos Ayres, 1822. Greenhouse. (B. M. 2107; L. B. C. 1419.) SYN. *Amoryllis candida* (B. R. 729).

**Z. carinata** (keeled).\* *fl.* perianth tube green, 3 in. long, straight, the segments pink, 2 in. long, obovate-oblong, acute, many-nerved; pedicel 1½ in. long, shorter than the tubular, bifid spathe; scape 1 ft. high, glabrous, reddish at base. May. *l.* ½ in. broad, channelled, keeled, green, reddish at base. Mexico, 1824. Half-hardy. (B. M. 2594; S. B. F. G. ser. ii. 4.) *Z. grandiflora* is a form with pretty, bluish flowers 3 in. long. (B. R. 902 [the flower only; the leaves belong to another species].)

**Z. citrina** (citron-yellow).\* *fl.* perianth tube ½ in. to 1 in. long, the segments bright yellow, 1½ in. long, oblong, sub-acute, connivent; pedicel less than 1 in. long; spathe short, tubular; scape 4 in. to 5 in. long, tinged with red-brown below. August. *l.* three or four, narrow-linear, bright green, about 1 ft. long, ½ in. broad, deeply channelled above, rounded below, reddish-brown towards the base. Tropical America. (B. M. 6665.)

**Z. concolor** (one-coloured). *fl.* perianth pale green or sulphur-coloured, nearly regular, erect, the segments oblong, acute; spathe tubular, coloured, shorter than the pedicel. April. *l.* erect, glaucous. *h.* 1 ft. Mexico, 1844. Greenhouse. SYN. *Habranthus concolor* (B. R. 1845, 54).

**Z. flava** (yellow). *fl.* sessile; perianth of a beautiful pale golden-yellow, 3 in. to 4 in. long, the segments lanceolate, acute; spathe bifid, rather longer than the perianth tube; scape terete, in cultivation shorter than the leaves, longer and more robust in the wild state. May. *l.* one or two, linear, narrowed and recurved at apex, dark green, channelled. *h.* 1 ft. Peru, 1835. Greenhouse. SYNS. *Pyrolirion aureum* (B. R. 1724), *P. flavum*.

**Z. gracilifolia** (slender-leaved). *fl.* pedicellate, erect, closing at night, inodorous; perianth rose-coloured, 1½ in. long, the tube green; pedicel 2 in. to 2½ in. long; spathe tubular, cut at apex, 1½ in. long; scape 7 in. to 8 in. long, purplish at base. January. *l.* 1½ ft. long; very slender, sub-cylindrical, shining green, deeply channelled above. South America, 1821. Hardy. SYN. *Habranthus gracilifolius* (B. M. 2464).

**Z. g. Boothiana** (Booth's). *fl.* perianth pink, nodding; pedicel purplish; scape erect. *l.* glaucous-green, round and blunt at apex. Brazil, 1822. SYN. *Habranthus gracilifolius Boothianus* (B. R. 1967).

**Z. grandiflora** (large-flowered). A form of *Z. carinata*.

**Z. macrosiphon** (large-tubed). *fl.* perianth bright rose-red, 2½ in. to 3 in. long, the segments sub-erect, obovate, obtuse, about ½ in. broad; pedicel about 1 in. long; spathe two-valved, 1½ in. long; scape terete, about as long as the leaves. *l.* three or four, linear, 1 ft. long, ½ in. broad, bright green, rather fleshy, shallowly channelled. Mexico, 1881.

**Z. mesochloa** (half-green). *fl.* perianth green below, white above, red externally, 1½ in. long, the tube very short, the outer segments ½ in. broad, the inner ones narrower, all acute; pedicel about 1 in. long; spathe fenestrate or divided at apex; scape 7 in. long. June. *l.* eight or nine, green, channelled, acute. Buenos Ayres, 1825. Half-hardy. (B. R. 1361.)

**Z. pumila** (dwarf). *fl.* perianth rose-coloured, drooping, the segments spreading; scape short. September. *l.* narrow. Chili, 1831. Greenhouse. SYN. *Habranthus pumilus* (L. B. C. 1771).

**Z. robusta** (stout). *fl.* perianth purplish-rose, becoming white, 3 in. long, with scarcely any tube, the outer segments broader than the inner ones; spathe 3 in. long, undivided, the pedicel rather longer; scape robust. June. *l.* slightly glaucous, channelled. Bonaria, 1828. Greenhouse. SYN. *Habranthus robustus* (L. B. C. 1761; S. B. F. G. ser. ii. 14).

**Z. rosea** (rose-coloured).\* *fl.* smaller than in *Z. carinata*; perianth rose-coloured, regular, erect, the segments rotate-spreading, oval, apiculate, green below the middle, nearly free to the base; pedicel 1½ in. long; spathe reddish, bilobed; scape 6 in. long, compressed. May. *l.* linear, flat, glabrous, striated, rounded at apex, 6 in. or more long, recombent. Cuba, 1823. Plant tufted, half-hardy. (B. M. 2537; B. R. 821.)

**Z. sessilis** (sessile). *fl.* perianth tube more than ½ in. long, the limb white, the outer segments more or less red; ovary sessile; style much deflexed. April. *l.* slender, semi-cylindric, green, 8 in. to 9 in. long. Mexico, 1870. Greenhouse. (Ref. B. 212.)

**Z. s. striata** (striated). *fl.* perianth segments striated with red outside; style longer than the filaments. 1824. SYN. *Z. striata* (B. M. 2593.)

**Zephyranthes**—continued.

**Z. s. verecunda** (modest). *fl.*, perianth tube green, *gin.* long, the limb white,  $1\frac{1}{2}$  in. long, reddish outside; sepaline filaments shorter, petaline ones longer, than the style. 1824. SYN. *Z. verecunda* (B. M. 2583; Ref. B. 356).

**Z. Spofforthiana** (Spofforth). A synonym of *Z. tubispatha hybrida*.

**Z. striata** (striated). A variety of *Z. sessilis*.

**Z. tubispatha** (tubular-spathed). *fl.* fragrant, slightly nodding; perianth white, nearly 2 in. long, with scarcely any tube; pedicel nearly 2 in. long; spathe lin. long, erect, cylindrical, bifid; scape 3 in. to 4 in. long, purplish at base. May. *l.* few, ligulate-linear, squalling the scape, two to three lines broad, slightly obtuse. Jamaica. Stove. SYN. *Amaryllis tubispatha* (B. M. 1586).

**Z. t. hybrida** (hybrid). *fl.*, perianth flesh-coloured. A hybrid between *Z. tubispatha* and *Z. carinata*. SYN. *Z. Spofforthiana* (B. R. 1746).

**Z. verecunda** (modest). A variety of *Z. sessilis*.

**Z. versicolor** (various-coloured). *fl.*, perianth at first rose-coloured, at length white, suffused with rose-colour, red at apex, red-striated below, the middle nerve green, 2 in. long; pedicel  $1\frac{1}{2}$  in. long, pale green; spathe and scape at first rose-coloured, becoming red, the former  $1\frac{1}{2}$  in. long, the latter 5 in. long. Winter. *l.* three or more, nearly 1 ft. long, 3 in. broad, acute. South America, 1821. Hardy. SYN. *Habranthus versicolor* (B. M. 2489).

**ZEPHYR FLOWER.** See **Zephyranthes**.

**ZERUMBET.** Included under **Zingiber** (which see).

**ZEUXINA** (from *zeuxis*, a joining; so called from the coherency of the petals with the upper sepal). SYN. *Adenostyles*, *Psychechilus*, *Tripleura*. Including *Haplochilus* and *Monochilus* (of Wallich). ORD. *Orchideae*. A genus comprising about seventy-six species of slender or dwarf, stove, terrestrial Orchids, inhabiting the East Indies, the Malayan Archipelago, and tropical Africa. Flowers small, in sessile spikes; upper sepal erect, concave, the lateral ones spreading; petals narrow, often cohering with the upper sepal in a hood; lip adnate to the base of the very short column, erect, concave or slightly saccate at base, within naked, or with two calli, more or less contracted above the base. Leaves linear, ovate, or lanceolate, petiolate. Only one species calls for mention here. It requires similar treatment to that recommended for *Anectochilus*.

**Z. regia** (royal). Striped King of the Woods. *fl.* white and green, in loose spikes; lip split into a pair of roundish, crenate lobes. *l.* ovate-lanceolate, 3 in. long, with a dark green margin and a broad, pale lilac or whitish band down the centre. *h.* 5 in. Borneo. SYN. *Anectochilus lineatus*, *Haplochilus regium*, *Monochilus regium*.

**ZEUZERA ÆSCULI** (Wood Leopard Moth). A handsome Moth, with a spread of wings of from 2 in. to 3 in. The body is from  $1\frac{1}{2}$  in. to  $1\frac{1}{2}$  in. long, and is rather

**Zeuzera Æsculi**—continued.

on the fore wings, and lighter on the hind wings. The thorax is white, with a row of three large, black spots on each side, and a smaller one behind. The abdomen is grey. The antennæ are slender in the female, but in the male the basal half of each is like a double comb.



FIG. 256. LARYA OF ZEUZERA ÆSCULI.

The larva (see Fig. 256) is cylindrical, naked, yellowish-white, with raised, shining, black spots, a blackish plate on the front of the ring just behind the head, and a black patch on the last segment. It feeds in the wood of living trees—among the kinds attacked by it being Apple, Elm, Horse-Chestnut, Pear, Plum, and Poplar—but seldom does noteworthy injury to them; indeed, Newman observed that infested trees bore even more abundant fruit than perfectly healthy ones. Should remedies be required, the best are the removal (for firewood) of infested trunks, the capture of the Moths on the trees in early morning, and plastering the lower part of the trunk with a mixture of clay and cow's urine. Insecticides may be injected into holes made by the larvæ, should such be found.

**ZEZEMENIA** (an anagram of *Ximenesia*). SYN. *Lipochæte* (in part). ORD. *Compositæ*. A genus embracing about twenty-five species of stove, greenhouse, or hardy, annual or perennial herbs or sub-shrubs, sometimes tall climbers, inhabiting the warmer parts of America. Flower-heads yellow, solitary, corymbose, or sub-umbellate, heterogamous, radiate; involucre variable, the bracts in two, three, or several series; receptacle convex, the pales sheathing the flowers; ray florets ligulate, spreading, entire, or two or three-toothed; disk florets tubular, the apex shortly five-cleft; achenes usually slightly pilose. Leaves opposite, entire or toothed. Only two species call for mention here. They thrive in any fairly rich soil. *Z. aurea* may be increased by cuttings, inserted in sandy soil, under a glass, in heat; and *Z. ovata* may be readily propagated by seeds, sown on the open border.

**Z. aurea** (golden). *fl.*-heads golden-yellow, solitary and terminal in the upper axils; ray florets seven to nine, twice as long as the involucre. September. *l.* opposite, sessile, ovate-lanceolate, obtuse at base, slightly acuminate at apex, serrated, pubescent on both sides. Branches terete, villous-canescens. *h.* 1 ft. Mexico, 1829. Half-hardy sub-shrub. SYN. *Verbesina aurea*, *Wedelia aurea* (B. M. 3384).

**Z. ovata** (ovate-leaved). *fl.*-heads deep orange-yellow; ray florets elliptical; peduncles short, terminal, sometimes solitary, sometimes arranged in a kind of corymb. Autumn. *l.* sessile, the basis (scarcely a petiole) amplexicaul, ovate, acute, serrated, triple-nerved, paler beneath. Stem rounded, branched, hairy. *h.* 2 ft. Mexico, 1828. Hardy annual. SYN. *Tithonia ovata* (B. M. 3901).

**Z. texana** (Texan). A synonym of *Wedelia hispida*.

**ZICHYA.** Included under **Kennedyia** (which see).

**ZIERIA** (named after John Zier, a Polish botanist, who was a friend of Smith, the nomenclator). Australian Turmeric-tree. ORD. *Rutaceæ*. A genus comprising half-a-score species of greenhouse, glabrous, hirsute, or tomentose shrubs or small trees, endemic in Australia. Flowers white, usually small, axillary, in small, trichotomous cymes, or rarely solitary; calyx four-cleft; petals four, imbricated or almost valvate in bud, spreading; stamens four. Leaves usually opposite, with three leaflets, rarely alternate or simple. A selection of the introduced species is here given. They thrive in a mixture of sandy loam and peat, and flower at midsummer. Young cuttings root readily in sand, under a glass.



FIG. 255. ZEUZERA ÆSCULI (FEMALE).

slender; and the wings are narrower than is usual in Moths. All the wings are semi-transparent white, with numerous spots (see Fig. 255), which are blue-black

**Zieria**—continued.

**Z. arborescens** (tree-like). A synonym of *Z. Smithii macrophylla*.

**Z. hirsuta** (hirsute). A synonym of *Z. pilosa*.

**Z. lævigata** (smooth). *fl.*, petals three times as long as the calyx; cymes few-flowered, about as long as the leaves. *l.*, leaflets three on a common petiole, linear, pointed,  $\frac{1}{2}$  in. to 1 in. long, the margins closely revolute. *h.*  $\frac{1}{2}$  ft. 1822. A glabrous, erect shrub. (B. iv. 185; P. M. B. ix. 77.)

**Z. lanceolata** (lance-leaved). A synonym of *Z. Smithii*.

**Z. macrophylla** (large-leaved). A form of *Z. Smithii*.

**Z. oboordata** (obcordate). *fl.* one to three in the axils, very small, on short, slender pedicels. *l.*, leaflets three, on a very short common petiole, obovate or obcordate, two to four, or rarely six lines long, softly pubescent or tomentose above, more hirsute or velvety and whitish beneath, the margins recurved or revolute. 1824. A shrub of low growth.

**Z. pilosa** (pilose). *fl.* small, solitary, and nearly sessile, or two or three together on short pedicels. *l.*, leaflets three, on a short common petiole, linear, oblong, or lanceolate, obtuse,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in., or rarely 1 in. long, slightly pubescent or glabrous above, more or less hirsute or tomentose beneath, the margins recurved or revolute. *h.*  $\frac{1}{2}$  ft. 1822. A shrub or under-shrub, with densely pubescent or hirsute branches. SYN. *Z. hirsuta*.

**Z. Smithii** (Smith's).\* Sandfly Bush; Tasmanian Stinkwood. *fl.* usually about  $\frac{1}{2}$  in. in diameter, in axillary, bi- or trichotomous cymes, shorter than the leaves. *l.*, leaflets three, with a distinct common petiole, lanceolate, or the larger ones oblong, elliptic, acute or rarely obtuse, 1 in. to 2 in. long, flat, or the margins slightly recurved. 1808. A tall shrub or small tree, glabrous or slightly pubescent. (A. B. R. 606; B. M. 1395.) SYN. *Z. lanceolata* (L. B. C. 878).

**Z. S. macrophylla** (large-leaved). *fl.* larger than in the type. *l.*, leaflets often  $\frac{3}{4}$  in. long. A more arborescent form. SYNS. *Z. arborescens*, *Z. macrophylla* (B. M. 4451).

**ZIETENIA**. A synonym of *Stachys* (which see).

**ZIGADENUS**. See *Zygadenus*.

**ZILLA** (the Arabic or Egyptian name of the plant). ORD. *Cruciferae*. A small genus (four species) of half-hardy, suffrutescent herbs, inhabiting North Africa, Arabia, and Persia. Flowers white or violet, solitary or loosely racemose, ebracteate. Leaves oblong, toothed, rather thick. Two of the species have been introduced, but probably they are not now in cultivation.

**ZINGIBER** (from the Greek *Zingiberis*, used by Dioscorides, which is in its turn derived from the Sanscrit, and means in that language horn-shaped; probably in reference to the form of the rhizomes). Including *Zerumbet*. TRIBE *Zingibereæ* of ORD. *Scitamineæ*. A genus comprising about twenty species of stove or greenhouse, perennial herbs, with horizontal, tuberous rhizomes, inhabiting the East Indies, the Malayan Archipelago, and the Mascarene and Pacific Islands. Flowers one to three to a bract, borne in spike-like, dense, cone-formed, or rather long thyrses; calyx tubular, shortly three-lobed; corolla lobes narrow, the upper one erect, incurved, the lateral ones spreading; lip or lips entire or shortly bifid, sometimes slightly crisped. Stems leafy, floriferous or sterile. Several of the species are grown in our hot-houses as curiosities. The rhizomes of *Z. officinale* furnish the well-known spice called ginger. The plants here described thrive in a compost of loam, peat, and sand, and require stove heat. They may be increased by divisions. During the winter many die down, and then, until growth begins again, water should be almost withheld.

**Z. brevifolium** (short-leaved). *fl.* yellow, rather small, with narrow segments, and a narrow, three-lobed lip; spike  $\frac{2}{3}$  in. to  $\frac{3}{4}$  in. long, fusiform, with adpressed, oblong, orange-yellow bracts, striped with red. *l.* few, oblong-lanceolate or elliptic,  $\frac{2}{3}$  in. to  $\frac{4}{5}$  in. long,  $\frac{1}{4}$  in. to  $\frac{1}{2}$  in. broad. Stems naked below. *h.* 1 ft. Philippine Islands, 1886.

**Z. Cassumunar** (Cassumunar). Bengal Root. *fl.* pale sulphur; lip four-cleft, the lateral lobes shorter; bracteoles ovate, bilobed; bracts nearly round, reddish, pilose; thyse ellipsoid; scape  $\frac{8}{10}$  in. to 14 in. long, red-sheathed. July and August. *l.* sessile, lanceolate, pilose beneath and on the sheaths. Stems annual,  $\frac{3}{4}$  ft. to 5 ft. high. Root yellow. East Indies, 1807. (B. M. 1426.)

**Z. Cliffordiæ** (Lady de Clifford's). *fl.* corolla white, the segments lanceolate, sub-equal; lip simple; lower bracts broadly cuneate, the upper ones scarlet, margined with green, ovate,

**Zingiber**—continued.

obtuse; thyse ovate; scape  $\frac{3}{4}$  in. to 4 in. long. *l.* long-lanceolate. Stem purplish at base. Guinea. Probably a variety of *Z. Cassumunar*. (A. B. R. 555.)

**Z. coloratum** (coloured). *fl.* of a creamy-white colour; inflorescence radical, fusiform, acute, densely covered with crimson bracts. *l.* distichous, lanceolate, acuminate, sub-sessile. Stems purplish, leafy,  $\frac{3}{4}$  ft. high. North-west Borneo, 1879.

**Z. elatum** (tall). *fl.* of a bright, lively yellow; spikes terminal, solitary, narrow-lanceolate,  $\frac{6}{10}$  in. long. July and August. *l.* linear, recurved, 1 ft. to  $\frac{1}{2}$  ft. long, 1 in. broad, smooth above, softly white-hairy beneath. Stems straight,  $\frac{4}{5}$  ft. to 5 ft. high. Root tuberous. East Indies, 1820.

**Z. officinale** (official). Ginger. *fl.*, corolla lobes pale yellow, lanceolate; lip dark blue and variegated, three-lobed; bracts imbricated, roundish-ovate, blunt, membranous; spike ovoid, dense,  $\frac{1}{2}$  in. to  $\frac{2}{3}$  in. long; scape radical, 1 ft. to  $\frac{1}{2}$  ft. high. July. *l.* linear-lanceolate, acuminate,  $\frac{8}{10}$  in. to 12 in. long, tapering towards the bilobed ligule. Sterile stem twice or thrice as long as the scape. East Indies, 1605. (B. M. Pl. 270.)

**Z. Parishii** (Parish's). *fl.*, corolla straw-coloured, with purple veins; bracts yellow-green, with a scarlet margin; spikes cylindrical,  $\frac{4}{10}$  in. to  $\frac{6}{10}$  in. long. July. *l.* elliptic-lanceolate,  $\frac{4}{10}$  in. to  $\frac{7}{10}$  in. long. Rhizomes creeping,  $\frac{3}{4}$  ft. long. *h.*  $\frac{3}{4}$  ft. Moulmein, 1873. (B. M. 6019.)

**Z. Zerumbet** (Zerumbet). *fl.* pale sulphur, large; lateral lobes of lip very large; bracts one-flowered; spikes oval, obtuse, about the size of a goose egg, on long peduncles. Summer. *l.* sessile, broadly lanceolate, entire, smooth, waved. Stems annual,  $\frac{3}{4}$  ft. to 4 ft. high. Root white outside, pale yellow within. East Indies, 1690. (B. M. 2000; S. E. B. 112.)

**ZINGIBEREÆ**. A tribe of *Scitamineæ*.

**ZINNIA** (named in honour of John Godfrey Zinn, 1727-1759, Professor of Botany at Gottingen). Youth and Old Age. SYNS. *Crassina*, *Lejica*. ORD. *Compositæ*. A genus embracing about a dozen species of half-hardy,



FIG. 257. FLOWERING BRANCH OF SINGLE STATE OF *ZINNIA ELEGANS*.

Mexican, annual or perennial herbs or sub-shrubs. Flower-heads variously coloured, heterogamous, radiate, mediocre or large, pedunculate, at the tips or forks of the branches; involucre campanulate or sub-cylindrical, the bracts in three or several series, the outer ones gradually shorter; receptacle conical or at length cylindrical; ray florets

**Zinnia**—continued.

ligulate, spreading, in one series; disk florets tubular, shortly five-cleft at apex; achenes narrow, striated, glabrous or ciliated at the angles. Leaves opposite, entire. The best-known species (all annuæ) are here described. They flower during the summer months. *Z. elegans* and *Z. multiflora* last a long time in beauty. Zinnias succeed best in a rich, deep, loamy soil, and in a sunny situation. Seeds should be sown on a gentle hotbed at the end of March or in April, and the young plants thrive best if pricked off in frames when large enough. They should be transferred to the situations in which they are intended to flower early in or about the middle of June. If sown too early, and allowed to become starved previous to the final planting, they never succeed so well afterwards. From *Z. elegans* most of the garden varieties have descended; there are numerous single and double forms, all of which are fine, free-flowering subjects when well grown.

**Z. elegans** (elegant). \* *f. heads* scarlet, crimson, rose-coloured, buff, or white; involucre bracts ovate, obtuse, the upper ones margined with black; pales of the receptacle serrate-crested; peduncles cylindrical, solitary, longer than the leaves. *l.* sessile, amplexicaul, cordate-ovate. Stem erect, hairy. *h.* 2 ft. 1796. See Fig. 257. The following are varieties: *coccinea*, upper ray florets of a beautiful scarlet (B. R. 1294; P. M. B. i. 223, under name of *Z. violacea coccinea*); *Darwinii*, a splendid hybrid; *flore-pleno*, a fine, double-flowered variety (B. H. 1861, p. 201, and 1862, p. 193); *violacea*, upper ray florets purplish-violet (A. B. R. 55, under name of *Z. violacea*; B. M. 527, under name of *Z. elegans*).

**Z. Haageana** (Haage's). *f. heads* similar in size to those of *Z. elegans*; ray florets brilliant golden-yellow or orange. Summer. *l.* sub-sessile or sessile, and, as well as the stems, hairy-pubescent. *h.* 1 ft. to 1½ ft. Central America (?), 1862. (R. G. 1863, 390.)

**Z. hybrida** (hybrid). *f. heads* scarlet; involucre scales adpressed; pales entire; peduncles terminal, solitary, short. *l.* cordate, somewhat lanceolate, sessile, amplexicaul. Stems erect, pubescent. *h.* 2 ft. 1818. Probably a hybrid between *Z. elegans* and *Z. pauciflora*. (B. M. 2123.)

**Z. multiflora** (many-flowered). *f. heads*, involucre campanulate, with adpressed scales; pales obtuse; ray florets scarlet or red; disk yellow; peduncles exceeding the leaves. *l.* scarcely petiolate, ovate-lanceolate. Stems erect, branched, very slightly hairy. *h.* 2 ft. 1770. Allied to *Z. pauciflora*. (B. M. 149.)

**Z. pauciflora** (few-flowered). *f. heads* yellow; involucre scales adpressed; pales entire; ray florets obovate, obtuse or one or two-toothed at apex; terminal peduncles striated, obconical, the lateral ones slenderer. *l.* sessile, cordate-lanceolate, somewhat amplexicaul. Stem erect, hairy. *h.* 2 ft. 1753.

**Z. tenuiflora** (slender-flowered). *f. heads* on very long, cylindrical peduncles; involucre oblong, the scales adpressed, scarcely margined; ray florets scarlet, seven to eight lines long, entire or bidentate and revolute at apex. *l.* very shortly petiolate, cordate-lanceolate. Stems erect, scarcely pubescent. *h.* 2 ft. 1799. (B. M. 555.)

**Z. verticillata** (whorled). *f. heads* red; involucre campanulate, with adpressed scales; ray florets obovate, emarginate at apex, often in two or three series; peduncles short, obconical. *l.* oblong-lanceolate, sometimes crowded in irregular whorls, sometimes spirally disposed. Stems erect, sparsely hairy. *h.* 2 ft. 1789. (A. B. R. 189.) "Probably a robust cultivated state of *Z. elegans*" (Hemsley).

**ZIZANIA** (adapted from *Zizanon*, the old Greek name of some wild grain; it is the word which, in the New Testament, is translated "tares"). Water or Indian Rice. *Syns.* *Hydrophyrum*, *Melinum*. *ORD.* *Gramineæ*. A small genus (two species) of tall, hardy, aquatic Grasses, natives of North America. Flowers monœcious; spikelets jointed with the club-shaped pedicels, very deciduous; glumes wanting or rudimentary; panicle ample, terminal. Leaves long and flat. The grain of *S. aquatica* (Canada or Indian Rice; Water Oats) is largely gathered for food by the North-west American Indians. The species have no horticultural value.

**ZIZIA**. Included under *Carum*.

**ZIZIPHORA** (from *Zizi*, which is said to be the Indian name of the flower, and *phoreo*, I bear). *ORD.* *Labiata*. A genus comprising about a dozen species of hardy, dwarf, annual herbs or diffuse sub-shrubs, inhabiting Central and Western Asia, and the South Mediterranean region.

**Zisiphora**—continued.

Flowers small, sub-sessile, or on short pedicels; calyx tubular, elongated, bilabiate; corolla tube scarcely exerted, the upper lip erect and entire, the lower one spreading and three-cleft; perfect stamens two; whorls few-flowered, axillary, clustered on the upper part of the stem. Leaves small, entire or few-toothed; floral ones conformed or slightly shorter and broader. The best-known species are here described. Both are half-hardy sub-shrubs, and thrive in any good, light soil. Propagation may be effected by cuttings.

**Z. clinopodioides** (Clinopodium-like). *f.* blue-purple; corolla nearly twice as long as the calyx; whorls few, six to ten-flowered, approximating in a rather loose, sub-globose head. June. *l.* at length nearly all ovate, the upper ones narrow, oblong, or ovate, ½ in. long, narrowed to short petioles. Branches diffuse, 6 in. to 12 in. long, often purplish. Siberia, 1821.

**Z. o. media** (intermediate). *f.* calyx pilose. *l.* mostly narrow. (B. M. 906, under name of *Z. serpyllacea*.)

**Z. dasyantha** (thick-flowered). *f.* red; calyx very pilose-hispid; corolla shorter than in *Z. clinopodioides*; whorls approximating in an oblong head, or the lower ones distinct. July. *l.* ovate or oblong; floral ones conformed. *h.* 6 in. Siberia, 1803. (B. M. 1033, under name of *Z. Pouschkei*.)

**ZIZYPHUS** (*Zizouf* is the Arabic name of the Lotus).

*ORD.* *Rhamnæ*. A genus comprising about fifty species of stove, greenhouse, or hardy trees or shrubs, often decumbent or sarmentose, and frequently prickly; they inhabit tropical Asia and America, and the temperate regions of both hemispheres. Flowers greenish, small, fasciated or in sessile or pedunculate cymes; calyx with five spreading lobes; petals five, cucullate, deflexed, rarely absent; stamens five. Fruit fleshy or dry, with a woody or bony, one to four-seeded and one to four-celled stone. Leaves sub-bifarious, alternate, usually coriaceous. A selection of the introduced species is here given. The fruits of *Z. vulgaris* are commonly eaten, both fresh and in a dried state, in the Mediterranean region, and afford the jujubes of the shops. *Z. Lotus* is supposed to have yielded the seductive, sweet fruits from which the ancient Lotophagi took their name. An excellent dessert fruit is obtained from *Z. Jujuba*, a species largely cultivated by the Chinese. *Z. spina-Christi* is supposed by some persons to have furnished the crown of thorns placed on our Saviour's head at His Crucifixion. The stove and greenhouse species thrive in a compost of sand, loam, and peat; and ripened cuttings of them root readily in sand, under a glass, those of the stove species requiring heat. The hardy kinds are admirably adapted for planting in shrubberies; they may be propagated by ripened cuttings, inserted in soil, under a glass; or by pieces of the roots.

**Z. incurva** (incurved). *f.* in pedunculate, axillary cymes ½ in. long. June. *fr.* ½ in. long, ellipsoid, two-celled. *l.* 2½ in. long, ovate or ovate-oblong, acute or slightly acuminate, crenate-serrated, glabrous. *h.* 6 ft. and upwards. Nepal, 1823. Hardy, unarmed tree.

**Z. Jujuba** (Jujube). Jujube-tree. *f.* in cymes ½ in. long. April. *fr.* ½ in. to ¾ in. in diameter, globose, fleshy and mealy. *l.* 1 in. to 2½ in. long, elliptic-ovate to sub-orbicular, dark green and glabrous above, densely woolly-tomentose beneath. Young branches and flowers densely fuscous-tomentose. *h.* 30 ft. to 50 ft. North Africa, India, Australia, 1759. Greenhouse tree, usually armed. See Fig. 258. (B. F. F. 17; B. F. S. cxlix.; J. B. i. 140.)

**Z. Lotus**. African or Jujube Lotus. *fr.* yellow, roundish-ovate, small, farinaceous. *l.* ovate-oblong, obsolete crenated, and, as well as the branchlets, glabrous. Prickles twin, one recurved, the other straight, longer than the petioles. *h.* 2 ft. to 4 ft. South Europe, North Africa, 1731. Half-hardy shrub.

**Z. mucronata** (mucronate-leaved). *f.* cymes axillary, about as long as the petioles. June. *fr.* red, scarcely the size of a cherry. *l.* petiolate, ovate or cordate-ovate, obtusely acuminate, mucronulate, 1½ in. to 2 in. long, crenate-serrated, sometimes hairy on the nerves beneath. Branches greyish, flexuous, prickly. *h.* 25 ft. South Africa, 1810. Greenhouse tree.

**Z. Pallurus** (Pallurus). A synonym of *Paliurus aculeatus*.

**Z. spina-Christi**. Christ's-Thorn. *f.* on villous-tomentose, corymbose peduncles. August. *fr.* ovate-globose. *l.* ovate, obtuse, toothed, glabrous or pubescent beneath. Branchlets white; prickles twin, spreading, one straight, the other slightly incurved. *h.* 6 ft. West Asia, North Africa, Egypt. Hardy shrub.

**Z. vulgaris** (common). *f.* few, fasciated in the axils of the

**Zizyphus**—*continued*.

leaves. August. *fr.* red or black, succulent,  $\frac{1}{2}$  in. in diameter. *l.*  $\frac{1}{2}$  in. to  $2\frac{1}{2}$  in. long, sub-obliquely ovate, obtuse or sub-acute, crenate-serrated, glabrous. Prickles usually twin. *h.* 6 ft. and upwards. South Europe, &c., 1640. Hardy shrub or small tree. (S. F. G. 241.)

**ZOMICARPA** (from *zoma*, a kind of skirt, and *karpas*, a fruit; the pericarp of the fruit, when ripe,

**Zomicarpa**—*continued*.

few-flowered; peduncle slender, equalling the leaves. Leaves appearing before the flowers, long-petiolate, reniform, tripedatisect; segments elliptic-oblong, the lateral ones smaller; petiole sheathing towards the base. The species require similar culture to that recommended for **Staurostigma**.



FIG 258. FRUITING BRANCHLET OF ZIZYPHUS JUJUBA

bursts at the bottom and remains, covering the seeds like a skirt). ORD. *Aroideæ* (*Araceæ*). A small genus (three species) of stove, tuberous, perennial herbs, natives of Brazil. Flowers monœcious; perianth none; spathe rather fleshy, persistent, the tube convolute, hooded at base, with connate margins, the throat constricted, the lamina lanceolate, acuminate, reticulate-veined; spadix shorter than, and adnate at base with, the spathe, with a slender appendage; male inflorescence dense, female

**Z. Pythonium** (*Pythonium*). *fl.*, spathe glaucous-violet; spadix slightly exceeding the spathe tube, the naked part subulate, shorter than the inflorescence; peduncle terete. *l.* reniform; segments five, distant at base, the lateral ones half-lanceolate and ovate-oblong, the middle one broadly elliptic; petioles slender, terete, rather broadly sheathing, thrice as long as the blades. *h.* 1 ft. 1860. This plant is regarded as an antidote in cases of serpent bites.

**Z. Riedeliana** (*Riedel's*). *fl.*, spathe green; spadix much exceeding the spathe tube, the naked part club-shaped, longer than the inflorescence. *l.* reniform; segments mucronate-cuspid.

**Zomicarpa**—continued.

date, the upper one distant from the approximate lateral ones; petioles thrice as long as the leaves, rather broadly sheathing at base. *h.* 1 ft. 1860. (Ref. B. 15.)

**Z. Steigeriana** (Steiger's). *fl.*, spathe blackish-purple, arched at apex; spadix whitish and dark fuscous-purple, not reaching beyond the middle of the spathe, the appendage club-shaped; peduncle rather longer than the petioles. *l.* green, paler beneath, trisected; segments equal or unequal, oblong- or ovate-lanceolate, acuminate at apex, abruptly cuneate at base; petioles fuscous-spotted and striolate. *h.* 1 ft. 1860.

**ZOMICARPELLA** (a diminutive of *Zomicarpa*). ORD. *Aroidæ* (*Araceæ*). A monotypic genus. The species is a rather small, slender, tuberous-rooted, stove herb, allied to *Zomicarpa*. For culture, see **Staurostigma**.

**Z. maculata** (spotted). *fl.*, inflorescence very small; spathe dull green, *lin.* long, lanceolate, spreading out nearly flat, with revolute margins; spadix blackish, *lin.* long, very slender. *l.* ovate, deeply cordate-sagittate at base, dark green, with a series of irregular, pale green blotches arranged around, near the margins, somewhat resembling those of *Caladium marmoratum*, but much smaller. New Grenada, 1881.

**ZORNIA** (named after John Zorn, of Bavaria, 1739-1799, a botanical author). Including *Myriadenus*. ORD. *Leguminosæ*. A genus consisting of half-a-score species of stove or greenhouse, annual or perennial herbs, all American, one being also found in South Africa. Flowers interruptedly spicate or solitary, on axillary and terminal peduncles. Pods compressed. Leaves digitately two or four-foliate; leaflets often pellucid-dotted. Several species have been introduced, but they are more curious than beautiful. Probably, *Z. tetraphylla* is no longer in cultivation.

**Z. tetraphylla** (four-leafleted). *fl.* yellow; bracts glabrous, as long as the pods, five-nerved. July. *fr.*, pods prickly; prickles somewhat scabrous. *l.*, leaflets four, digitate, oblong, acuminate. *h.* 6 in. Carolina, 1824. Greenhouse perennial. SYN. *Anonymus bracteata*.

**ZOSTERA** (from *zoster*, a riband; alluding to the leaves). Grasswrack. SYN. *Alga*. ORD. *Naiadaceæ*. A small genus (four species) of hardy, Grass-like, marine plants, found on various coasts in the temperate zone. Flowers in two parallel series of alternating anthers and carpels on one surface of a linear, membranous, pedunculate spadix, which is inclosed in a sheathing, leaf-like spathe; perianth none. Leaves distichous, sheathing, long-linear. *Z. marina* (Bell Ware; Wrack Grass, &c.) is a British plant, found in muddy and sandy estuaries near low-water mark. *Z. nana* is another native species.

**ZOSTERÆE**. A tribe of *Naiadaceæ*.

**ZOSTEROSTYLIS** (from *zoster*, a riband, and *stylos*, a column; alluding to the band which surrounds the column). *Cryptostylis* is now the correct name. ORD. *Orchideæ*. A small genus (seven species) of stove or greenhouse, terrestrial Orchids; three inhabit the East Indies and the Malayan Archipelago, and the rest are Australian. Flowers rather large, in a loose raceme or spike; sepals and petals sub-equal, very slender, convolute and appearing subulate when the flower opens; lip superior, sessile, with a broad base inclosing the column, contracted above the column, and expanded into an undivided lamina; column very short; scapes leafless, simple, two or many-sheathed; bracts membranous, acute. Leaves few or solitary, on rigid petioles, oblong or narrow, membranous. For culture of *Z. arachnites*, the only species introduced, see **Spiranthes**.

**Z. arachnites** (cobwebby). *fl.* few or many in a loose spike 3 in. to 8 in. long, sessile; petals dull green, linear, and, as well as the longer sepals, much spreading; lip yellowish, mottled and lined with purple, pubescent or cobwebby, erect, elliptic-ovate or lanceolate, acute, grooved; scape 6 in. to 18 in. high, the base (and petioles) purple. *l.* long-petiolate, ovate, acuminate, striate-nerved. Root consisting of a few elongated tubers. Ceylon, 1863. (B. M. 5381.)

**ZUCCAGNIA**. A synonym of **Dipcadi** (which see).

**ZWINGERA**. A synonym of **Simaba** (which see).

**ZYGADENUS** (from *zygos*, a yoke, and *aden*, a gland; the glands are usually arranged in pairs at the base of the perianth segments). Erroneously spelt *Zigadenus*. Including *Amianthemum* and *Anticlea*. ORD. *Liliaceæ*. A genus comprising about a dozen species of hardy, bulbous or rhizomatous plants; one is a native of Siberia, and the rest inhabit North America, extending as far as Mexico. Flowers in a terminal, simple or paniculately-branched raceme; perianth persistent, the segments sometimes connate at base in a very short, turbinate tube, in other cases distinct, sub-equal, flat; stamens six, little shorter than the segments. Leaves radical, or clustered at the base of the stem, long-linear. Stem erect, simple below the inflorescence, with or without a few small leaves. The best-known species are here described; all are North American. A moist, peat soil is best suited to their requirements. Propagation may be readily effected by divisions, or by seeds.

**Z. angustifolius** (narrow-leaved). *fl.*, perianth white, turning purple, *lin.* to *4 in.* long; lower pedicels five to six lines long; raceme *lin.* to *3 in.* long, *lin.* to *4 in.* broad. May and June. *l.* nearly 1 ft. long, two to three lines broad, firmer and more distinctly ribbed than those of *Z. Muscetoicium*. Stem slender, 1 ft. to 1½ ft. high, with many reduced leaves. 1823. SYN. *Amianthemum angustifolium*, *Helonias angustifolia*, *H. lœta minor* (B. M. 1540).

**Z. elegans** (elegant). A synonym of *Z. glaucus*.

**Z. Fremonti** (Fremont's). *fl.*, perianth cream-coloured, five to six lines long, the segments oblong, obscurely clawed; racemes corymbose, 2 in. to 4 in. long, simple or paniculate. June. *l.* three or four, linear, rather firm, 1 ft. to 1½ ft. long, three to four lines broad, acuminate. 1874.

**Z. glaberrimus** (highly glabrous).\* *fl.*, perianth white, five to six lines long, the segments oblong, acute, distinctly clawed; pedicels ascending, three to six lines long; racemes five to ten-flowered, loosely paniculate, *lin.* to 2 in. long. June. *l.* linear, Grass-like, acuminate, 1 ft. to 1½ ft. long, three to four lines broad. Stem erect, with many reduced leaves. Rhizome creeping. *h.* 2 ft. to 3 ft. 1831. SYN. *Helonias bracteata* (B. M. 1703).

**Z. glaucus** (glaucous-leaved). *fl.*, perianth greenish externally, whitish inside, five to six lines long, the segments oblong, thickly nerved; pedicels ascending, *lin.* to 1½ in. long; racemes loose, 2 in. to 4 in. long, *lin.* to 2 in. broad, simple or loosely paniculate. Summer. *l.* four to six, firm, linear, glaucous-green, thickly nerved, 1 ft. to 1½ ft. long, *lin.* to *4 in.* broad. Stem 6 in. to 2 ft. high, with a few reduced leaves. 1828. SYN. *Z. elegans*, *Helonias glaberrima* (B. M. 1680).

**Z. Muscetoicium** (fly-poison). *fl.*, perianth greenish-white, *lin.* to *4 in.* long; lower pedicels *lin.* to *4 in.* long; raceme dense, oblong, 2 in. to 4 in. long, *lin.* to *1½ in.* broad. Summer. *l.* many, linear-lorate, membranous, nearly 1 ft. long, *lin.* to *4 in.* broad, obtuse. Stem slender, 1 ft. to 2 ft. high, with a few much-reduced leaves, slightly thickened at base. 1758. (R. G. 1121, f. 1.) SYN. *Amianthemum Muscetoicium*, *Helonias lœta* (B. M. 805; L. B. C. 998).

**Z. Nuttallii** (Nuttall's). *fl.*, perianth white, *lin.* to *4 in.* long; racemes often simple, dense above, 2 in. to 3 in., rarely 4 in. to 6 in., long; lower pedicels *lin.* to *4 in.* long. June. *l.* four to six, firm, linear, 1 ft. to 1½ ft. long, *lin.* to *4 in.* broad. Stem 6 in. to 18 in. high, with a few reduced leaves. 1883. (R. G. 1121, f. 2.)

**ZYGOGLOSSUM**. A synonym of **Cirrhopetalum** (which see).

**ZYGOMENES**. A synonym of **Cyanotis** (which see).

**ZYGOMORPHOUS**. A term applied to anything that can be bisected in only one plane into similar halves.

**ZYGOPETALUM** (from *zygos*, a yoke, and *petalon*, a petal; in the original species the sepals and petals adhere by their bases). Including *Bollea*, *Galeottia*, *Huntleya*, *Kefersteinia*, *Pescatorea*, *Promeneia*, and *Warszewiczella*. ORD. *Orchideæ*. A genus comprising about fifty species of very handsome, stove or greenhouse, epiphytal Orchids, inhabiting the warmer parts of America. Flowers large and showy; sepals and petals sub-equal, free or very shortly connected at base; lip affixed to the foot of the column, slightly incumbent, forming a short chin, the lateral lobes spreading or erect, clothing the column, the middle one flat and spreading; lip bearing a transverse crest, which, from being ribbed or plaited, has the appearance of a ruff or frill; column incurved, semi-terete, wingless or shortly two-winged at apex, produced in a short foot at base; pollen masses four; floriferous scapes



**Zygopetalum**—*continued*.

leafless, many-sheathed, one-flowered or terminated by a loose raceme; bracts small or rather broad. Leaves distichous, membranous or rather rigid, slightly plaited or with elevated veins. Stem leafy, short, at length thickening into a pseudo-bulb. The flowers are generally produced during winter—a circumstance which greatly enhances the value of Zygopetalums as decorative objects. The robust species, such as *Z. Mackayi*, may be grown along with *Cattleya Mossia*. They should be potted in rough peat and sphagnum, and watered freely when making their growth. During winter, they require only sufficient moisture to keep them from shrivelling. The *Pescatorea* section are much more difficult to manage. The large-leaved kinds may be grown in pans or baskets, using a mixture of peat-fibre, sphagnum, and lumps of charcoal. Some growers place these kinds on flat, dish-like saucers, with several large holes in the bottom, and simply place nodules of peat and charcoal about the roots as they multiply. Others fasten them on to large blocks of birch, placing the plants on the bark side of the block. The small, delicate kinds, such as *Z. gramineum*, thrive best in teak baskets. All the species like plenty of moisture when in full growth, and none should ever be allowed to get quite dry.

**Z. africanum** (African). A synonym of *Odontoglossum bictense*.

**Z. aromaticum** (aromatic). *fl.* solitary, strongly perfumed, 3in. to 4in. across; sepals and petals white, lanceolate, acute; lip azure-blue, darkening to purple at the base, obreniform, many-lobed, slightly crisped; disk smooth; a many-furrowed callus at the contracted base; scape erect. *l.* cuneate-oblong, acute. Chiriqui. Stove. (G. C. 1868, p. 75; R. X. O. i. 73.) SYNS. *Huntleya aromatica*, *Warsceviczella aromatica*.

**Z. Backhousianum** (Backhouse's). *fl.*, sepals and petals creamy-white, tipped with bright purplish-violet; lip deeply three-lobed, creamy-white, having a deep yellow callus of nineteen ribs, with brownish lines to the keels, the anterior portion yellowish, with small, purplish warts. Summer. Ecuador, 1877. Allied to *Z. Klabechorum*. Stove. SYN. *Pescatorea Backhousiana*.

**Z. Beaumontii** (Beaumont's). *fl.* 2in. across; sepals and petals light green, longitudinally striped with pale olive-brown; lip white, dotted and streaked with pale lilac-purple, triid, the side lobes toothed, incurved, bearing on the disk between them about seven long, parallel, acute crests; scapes erect, one or two-flowered. *l.* plicate, cuneate-oblong, light green. Pseudo-bulbs pyriform, tetragonal. Brazil, 1850. Stove. SYNS. *Batemannia Beaumontii* (R. X. O. iii. 215), *Galeottia Beaumontii*.

**Z. bellum** (pretty). *fl.* more than 3in. across; sepals and petals light violet, banded near the tip with dark purplish-violet; lip whitish-yellow, somewhat hooded, with a large callus of twenty-one ribs, the keels of which are purplish on their back line, the tip of the lip blotched with purplish-violet; column purplish, with a yellowish-white, triangular space at base, purplish-spotted. Spring. New Grenada, 1878. Intermediate. SYN. *Pescatorea bella*.

**Z. brachypetalum** (short-petaled). *fl.*, sepals and petals brown, marbled with green, short, stiff, convex, oblong, obtuse; lip white, veined with deep bluish-violet, transverse, roundish, emarginate, the crest or frill closely striped with blue; scape tall, many-flowered. *l.* lanceolate-ensiform, shorter than the scape. Brazil. Intermediate. (J. H. S. iv. (Proc.), p. 11.)

**Z. Burkel** (Burke's). *fl.* curiously marked, four or five on a radical scape; sepals and petals green, with thick bands of brown, which here and there break up into spots; lip white, with a ruff of about thirteen crimson plaits or folds. *l.* twin, elongated-lanceolate, acuminate. Pseudo-bulbs clustered, narrow-oblong, furrowed, about 2in. long. Guiana, 1883. Intermediate. (W. O. A. iii. 142.)

**Z. candidum** (white). *fl.* 2½in. across; sepals white, lanceolate, acute; petals white, broader, reflexed; lip rosy-purple in the centre, with a broad, bluish margin, quadrate-hastate; disk bearing a large, obtriangular, ivory-white callus, with a retuse, five-toothed apex, and marked with five bluish-purple bars. *l.* few, oblong-ligulate, forming a loose, distichous tuft. *h.* 8in. to 9in. Bahia. Stove. SYNS. *Huntleya candida*, *Warrea candida* (F. d. S. vii., p. 123; L. & P. F. G. i., p. 32), *Warsceviczella candida*.

**Z. cerinum** (waxy). *fl.* about 3in. across; sepals and petals pale waxy straw-colour, fleshy, concave, the lateral ones rather darker; lip yellow-clawed, convex, retuse, with a thick, semicircular ruff of numerous truncate plaits, within which is sometimes a band of deep purple, surrounding the base of the short, clavate, hoodless column; peduncles axillary, one-flowered, much shorter than the leaves. *l.* tufted, cuneate-oblong, acuminate, 1ft. long. Chiriqui, 1851. Intermediate. (F. d. S. 1815; R. G. 833.) SYNS. *Huntleya cerina* (B. M. 5598; L. & P. F. G. iii., p. 62), *Pescatorea cerina* (F. M. ser. ii. 93; R. X. O. i. 65).

**Zygopetalum**—*continued*.

**Z. citrinum** (citron-coloured). *fl.* of a deep rich yellow, with a dark crimson blotch at the base of the lip, which is obovate in the front, with two oblong, obtuse, erect basal lobes spotted with crimson; scapes deflexed, 2in. to 3in. long, one-flowered. Late summer. *l.* oblong-ligulate, pale green. Pseudo-bulbs clustered, small, ovate, tetragonal, two-leaved. Brazil, 1838. Intermediate. SYN. *Maxillaria citrina*, *Promeneia citrina* (W. O. A. i. 7).

**Z. Clayi** (Clay's). *fl.* freely produced; sepals and petals deep purplish-brown, margined, banded, and sometimes blotched, with green; lip deep violet-purple, with darker purple lines, paler at the edges, 1½in. wide, the ruff whitish, with bluish-violet plaits; scapes radical. 1876. A beautiful hybrid between *Z. crinitum* and *Z. maxillare*. Intermediate. (F. M. n. s. 267; W. O. A. 50.)

**Z. cochleare** (spoon-like). *fl.* white, about 1in. long; sepals and petals ovate, pointed; lip blue-variegated, somewhat quadrate-cordate, emarginate at the broadly rounded summit, crested at the base by a broadly reniform, longitudinally many-plaited callus; peduncles 3in. long, one-flowered. *l.* oblong, acute, tapering at the base, 6in. to 10in. long. West Indies. Stove. (B. M. 3585; B. R. 1857.)

**Z. celeste** (sky-blue). *fl.* 3in. to 4in. across; sepals and the shorter petals light blue at base, deeper mauve in the middle, the marginal tips white; lip deep violet in front, the prominent basal callus yellowish-white; column deep purple-blue, yellow at base; scapes 1½ft. to 1½ft. high. June and July. *l.* close-set, cuneate-oblong. Columbia, 1878. Closely allied to *Z. latindet*. Greenhouse. SYN. *Bollea celestis* (B. H. 1879, 9; B. M. 6458; R. G. 1075).

**Z. crinitum** (hairy). *fl.* large, beautifully variegated; sepals and petals green, barred with brown, oblong-lanceolate; lip white or cream-coloured, streaked with coloured, densely hairy veins, broad-obovate, emarginate; callus yellow, small, incurved; spikes sometimes two from a pseudo-bulb. *l.* lorate-lanceolate, plicate, shorter than the scapes. Pseudo-bulbs ovate. Brazil, 1829. Greenhouse. (L. B. C. 1687.) SYNS. *Z. Mackayi crinitum* (B. M. 3402), *Z. stenochilum* (L. B. C. 1923). "The best variety is that called *ceruleum*, which has the veins of a deep, bright blue. There is another form with the veins pink" (B. S. Williams).

**Z. Dayanum** (Day's). *fl.* similar in shape to those of *Z. crinitum*; sepals and petals milky-white, the former tipped with green, oblong-obovate, the latter roundish-rhomboidal; lip white, clawed, emarginate, with a purplish-violet ruff, the base, as well as the rays in front of the callus, purplish-violet; column yellow, with a broad, reddish band at base. New Grenada, 1873. Stove. SYN. *Pescatorea Dayana*. The following varieties are described by B. S. Williams, in the "Orchid Grower's Manual":

**Z. D. candidulum** (whitish). *fl.*, sepals and petals pure white, lip tinted with purplish-crimson. (G. C. n. s. iii., p. 343, under name of *Pescatorea Dayana candidula*.)

**Z. D. rhodacrum** (red-tipped). *fl.*, sepals and petals tipped with purplish-rose. (B. M. 6214, under name of *Pescatorea Dayana rhodacra*.)

**Z. D. splendens** (splendid). *fl.*, sepals and petals blotched at the tips with dark violet; lip deep violet, which colour extends to the base of the column.

**Z. discolor** (discoloured). *fl.*, sepals and petals straw-coloured, tinged with purple, 1½in. to 1½in. long, the lower sepals straight, deflexed, the upper erect, forming with the petals an arch over the column and lip; lip deep velvety-purple, white at base, concave, slightly trilobed, with a yellow, roundish-oblong appendage divided at the edge into strong, diverging teeth, five of which terminate so many distinct ribs. Central America. SYNS. *Warrea discolor* (B. M. 4330; L. & P. F. G. i., p. 73), *Warsceviczella discolor* (R. X. O. 93).

**Z. Dormanianum** (Dorman's). *fl.* white, with some light sulphur on the crest, narrower than in *Z. Klabechorum* and *Z. Lehmanni* (which this plant resembles); lip with a continuous row of angles on the hind margin of the side lobes, and three prolonged, connate, median keels; column sagittate at base. Columbia (?), 1881. Intermediate. SYN. *Pescatorea Dormaniana*.

**Z. euglossa** (beautiful-lipped). *fl.* of a beautiful lilac colour, similar to those of *Z. Roeblii*, but with a shorter lip and a broader callus, the tip of the lip bent underneath, ending in two diverging lobes. Ecuador, 1877. SYN. *Pescatorea euglossa*.

**Z. expansum** (expanded). *fl.*, sepals green, acute; petals brown in the upper part, blotched with brown in the lower, broader than the sepals; lip green, with five interrupted, brown stripes on the basal half, and similar-coloured blotches at the base of the front part, which is fringed. *l.* Grass-like, cuneate-oblong-ligulate, acute. Ecuador (?), 1878.

**Z. fimbriatum** (fringed). *fl.* about 2in. across; sepals and petals white in the lower and purple in the apical half, elliptic-oblong, acute; lip yellowish-white, with rosy dots, revolute and irregularly fringed on the margins; crest semicircular, composed of seventeen to nineteen dark purple ridges; peduncles short, one-flowered. Columbia, 1880. Intermediate. SYN. *Pescatorea fimbriata* (R. G. 1008).

**Z. Gairianum** (Gair's). *fl.* large; sepals and petals deep violet, oblong-ligulate, the anterior part deep black-purple within; lip purplish-rose or light purple-mauve, the front part reflexed on

**Zygopetalum**—continued.

the limb, so as to be nearly hood-shaped, marked by obscure, longitudinal keels, with numerous warts between; ruff of fifteen to seventeen radiating keels, in some forms orange with purple ridges; column dark violet above, whitish-yellow with some purple spots at the base. Ecuador, 1879. Stove. SYN. *Pescatorea Gairiana*.

**Z. Gautieri** (Gautier's). \* *f.* large; sepals and petals green, blotched and barred with brown, oblong, acute; lip deep purplish-blue, lighter at the edge, the ruff around the column large, and of a deep velvety-purple; racemes drooping, on scapes springing up in the midst of the young leaf-tufts. *l.* elongated-oblong, dark green, plaited. Pseudo-bulbs oblong, deeply furrowed. Brazil, 1868. Greenhouse. (W. O. A. i. 23.) The colour of the lip varies in several varieties from pale mauve (I. H. 1867, 535) to deep bluish-purple.

**Z. gemma** (gem). *f.* of a very pale colour, not much exceeding in size those of *Z. sanguinolentum*; lip marked with numerous dark blotches, denticulate and crisped. New Grenada, 1874. A small species. Intermediate. SYN. *Kefersteinia gemma*.

**Z. gramineum** (grass-like). *f.* dirty yellow, copiously brown-spotted; petals rather narrower than the sepals; lip broadly oval, gibbous at base beneath, concave in the centre above, the upper half suddenly bending downwards and emarginate at apex, the edge minutely denticulate; scapes three to five, clustered. *l.* about 9 in. long, erect or spreading, lanceolate. Pseudo-bulbs none. Popayan, 1857. Intermediate. SYN. *Kefersteinia graminea* (B. M. 5046; R. X. O. 25, ii.)

**Z. intermedium** (intermediate), of Loddiges. *f.*, sepals and petals green, tinged with brown, oblong, acute; lip blue, streaked with deep purple, downy-pubescent, large, flat, roundish, bilobed, undulated. Autumn. *l.* ensiform, shorter than the raceme. Brazil, 1844. Reichenbach regards this as a variety of *Z. Mackayi*. Greenhouse. SYN. *Z. velutinum*.

**Z. Klabochorum** (Klaboch's). \* *f.* 3 in. to 3½ in. across; sepals oblong, obtuse; petals shorter, cuneate; both white, deeply tipped with chocolate-purple; lip ochre or white, covered with lines of purple-tipped papillae, trowel-shaped, three-lobed; ruff of nineteen lamellae, sulphur-coloured, with brown keels; column yellowish, washed with brown and purple. Ecuador, 1879. Intermediate. SYN. *Pescatorea Klabochorum* (I. H. ser. iii. 431; L. & P. F. G., re-issue, 21; W. O. A. i. 17). Of this free-flowering species several varieties have been observed.

**Z. K. burfordiensis** (Burford). \* *f.* with broader and darker lamellae on the callus, the broad, middle line of the front part of the lip dark reddish-violet, the whole surface covered with styliform processes. 1879.

**Z. K. ornatisimum** (very ornamental). A fine variety, with very dark mauve-purple tips, and numerous similar spots at the base, of the petals, and a single spot at the base of the odd sepal. 1884.

**Z. lacteum** (milk-white). *f.* white, with a few brownish dots and streaks at the base, small; sepals and petals oblong, acute; lip very broad, cuneate-oblong, retuse; callus depressed, bifid at apex; column dilated in the middle, sometimes angled; peduncles one-flowered. *l.* exceedingly stout, cuneate-oblong, acute. Chiriqui, 1872. Intermediate. SYN. *Kefersteinia lactea*.

**Z. Lalindei** (Lalind's). *f.* about 3 in. across; sepals and petals lilac at base, pale rose above, or the flowers sometimes bright violet, the upper sepal tipped with green, and the lower part of the lateral ones brownish-purple; lip golden or orange-yellow, with about thirteen close-set lamellae; column rose-coloured, arched, broader than the lamellae disk; scapes solitary. *l.* elliptic-lanceolate, narrowing to the base, 1 ft. long, distichous, five-nerved. New Grenada, 1874. Intermediate. SYN. *Bollea Lalindei* (B. M. 6331).

**Z. lamellosum** (lamellate). *f.* 2½ in. across, on stout, solitary peduncles 3 in. long; sepals and petals yellowish-green, the dorsal sepal elliptic, acute, the lateral one larger, oblong, the petals spatulate; lip yellowish-white, nearly orbicular, cordate at base, the crest orange and brown, much raised, formed of close-set, concentric plates. August. *l.* 1 ft. long, narrow-lanceolate, acuminate, narrowed to the base, five-ribbed. Pseudo-bulbs none. Columbia, 1875. Plant densely tufted. Stove. SYN. *Pescatorea lamellosa* (B. M. 6240).

**Z. Lawrenceanum** (Lawrence's). *f.* white, solitary, on axillary scapes, 3½ in. to 4 in. across; sepals and petals blotched with violet or mauve at the tips; lip much shorter than the other parts, nearly square, the sides revolute, the apex of an intense, rich, velvety purple, the basal callus bright yellow, white on each side, large; column white, conspicuous, hooded. *l.* distichous, broadly ligulate, acuminate, keeled. Columbia, 1878. Intermediate. (R. X. O. iii. 221.) SYN. *Bollea Lawrenceana*.

**Z. Lehmanni** (Lehmann's). *f.* solitary, axillary, 3 in. to 3½ in. across, very showy; sepals and petals white, closely lined with reddish-purple, broadly cuneate-oblong; lip deep mauve-purple, the anterior part oblong, revolute, retuse, covered with long, bristle-like, purplish papillae, the callus of about eleven chestnut-brown ridges. *l.* linear-lorate, acute, 1 ft. to 1½ ft. high, about 4 in. across. Ecuador. Stove. SYN. *Pescatorea Lehmanni* (G. C. n. s., xvii., p. 45; I. H. ser. iii. 471; W. O. A. ii. 57.)

**Z. leopardenum** (leopard-spotted). *f.*, sepals and petals light greenish-yellow, spotted with brown; lip with a transverse,

**Zygopetalum**—continued.

obtuse-angled, cordate blade of a beautiful mauve-purple, and an ochreous callus with thirteen teeth. 1886. Garden hybrid. Intermediate.

**Z. Mackayi** (Mackay's). \* *f.* large, five or six in a raceme; sepals and petals yellowish-green blotched with brownish-purple, lanceolate; lip white, lined and spotted with purplish-blue, large, roundish, undulated, emarginate, horizontally spreading, the ruff white, striped with blue, large and convex; scape radical, 1½ ft. long. *l.* distichous, linear-lanceolate. Pseudo-bulbs large, ovate, scarred, bearing numerous leaves. Brazil, 1825. Greenhouse. (B. M. 2748; L. B. C. 1664; P. M. B. iii. 97.) SYN. *Eulophia Mackaiana* (B. R. 1433). Of this species there are several varieties.

**Z. M. crinitum** (hairy). A synonym of *Z. crinitum*.

**Z. M. intermedium** (intermediate), of gardens. *f.* of a paler colour than in the type, with a fine, large, expanded lip. *l.* longer. A very distinct plant.

**Z. marginatum** (margined). *f.* clear straw-colour, with some purple markings on the nearly square appendix to the lip; lateral sepals abruptly bent back, the upper one erect, all tipped with green; petals rolled back above the middle; lip circular, retuse, the edges bent downwards, the claw yellow, with a slight tubercle; column pure white. *l.* pale green, oblong, acute, flat, 6 in. long. Columbia. Allied to *Z. discolor*. Intermediate. SYNS. *Warrea quadrata* (B. M. 4766), *Warszewiczella marginata* (R. X. O. 23, f. 2).

**Z. maxillare** (jaw-shaped). \* *f.* large and showy; sepals and petals green, transversely blotched and barred with chocolate-brown, ovate-oblong, acute; lip rich bluish-purple, with a large, roundish front lobe and a blunt spur; ruff large, deeper purple, shaped like a horse's hoof, and united to the small, erect lateral lobes of the lip; spikes drooping, on radical scapes. *l.* lanceolate, attenuated at base, nerved. Pseudo-bulbs oblong, furrowed. As many as seventy flowers have been produced by one plant. Greenhouse. (B. iii., p. B. M. 3686; L. B. C. 1776; P. M. B. iv. 271; R. G. 1879, 345.)

**Z. Meleagris** (Meleagris). *f.* 3 in. to 4 in. across; sepals and petals tessellated, pale yellow on the basal half and purplish-brown upwards, broad at base, the two lateral sepals folded inwards on the inner margin at base; lip about half as large as the petals, similar but clawed, white, tipped with purplish-brown, and having at the base of the claw a crescent-shaped plate, fringed with long, yellowish hairs; peduncles axillary, one-flowered. June and July. *l.* broadly lanceolate, 1 ft. long, distichous. Stem short, erect. Brazil. Stove. SYNS. *Batemania Meleagris* (R. X. O. 66, figs. 1, ii.), *Huntleya Meleagris* (B. iii. 146; B. R. 1839, 14).

**Z. M. albidofulvum** (whitish-fulvous). *f.*, upper half of the sepals and petals fulvous, the lower part white; lip and column white, the former tipped with rosy-carmine, the latter with yellowish-green. *l.* light shining green. Stem none. Roots numerous. Brazil, 1868. Intermediate. SYN. *Huntleya albidofulva* (I. H. 1868, 556).

**Z. micropterum** (small-winged). *f.*, sepals and petals creamy-white or ochre; lip white, with three transverse bars of dull crimson on the disk, and small, purple spots at the base, the front lobes elongated, lanceolate, the two lateral ones minute. Summer. Related to *Z. xanthinum*. Intermediate. SYN. *Promeneva microptera*.

**Z. Murrayanum** (Murray's). *f.* many in a raceme; sepals and petals greenish, ovate-lanceolate, acute; lip white, the lateral lobes erect, the middle one reflexed, four times as large, purple-spotted at base, the prominent callus yellow, with five straight, violet-brown lines. *l.* lanceolate, striated. Pseudo-bulbs ovate, deeply furrowed. Organ Mountains, 1837. (B. M. 3674.)

**Z. mystacinum** (moustached). *f.*, sepals, petals, and blade of the lip yellowish-green; callus and stalk of the lip, and column, white, with purple dots, the blade of the lip broken up into numerous fringes. Otherwise closely resembling *Z. gramineum*. Columbia, 1881. SYN. *Kefersteinia mystacinum*.

**Z. obtusatum** (obtuse). *f.* disposed in a long raceme; sepals and petals green, with narrow, transverse brown bars, narrow, long, obtuse; lip of a very light violet, with a more purplish, retuse lower callus; bracts obtuse. 1878. This plant is very near *Z. maxillare*.

**Z. pallens** (pale). *f.*, sepals and petals light mauve, with greenish-yellow tips, the basal inner borders of the lateral sepals cinnamon-coloured, their lower halves being light yellow; lip light ochre, the orange-coloured callus painted with brownish-purple. 1881. Intermediate. SYN. *Bollea pallens*.

**Z. Patinii** (Patin's). *f.* solitary, upwards of 3 in. across; dorsal sepal and the oblong, undulated petals rosy-pink, the two lower sepals pink along the upper half, and deep rose along the lower side; lip yellow, short, the disk with a frill of about thirteen lamellae; column pink, large, convex, arching over the lip; scapes axillary, decurved. *l.* distichous, broadly oblong-ligulate, narrow at base, acute at apex, nerved. New Grenada, 1874. Stove. SYN. *Bollea Patinii* (F. M. ser. ii. 147; G. C. n. s., iii., p. 9).

**Z. pentaachromum** (five-coloured). *f.*, sepals and petals green,

**Zygopetalum**—*continued*.

marbled with dark brown; lip white, blotched and lined with mauve, cuneate-obovate; callus or ruff like that of *Z. Mackayi*, with adhering, acute, falcate side lobes. 1885. A hybrid between *Z. Mackayi* and *Z. maxillare*. Greenhouse.

**Zygopetalum**—*continued*.

in front, and a few parallel ones on the sides; sepals pale greenish or yellowish-white. 1883. SYN. *Warszewiczella picta*.

**Z. Rivieri** (Riviere's). *fl.* very large, disposed in racemes; sepals and petals green, blotched with light brown; lip white, flabel-

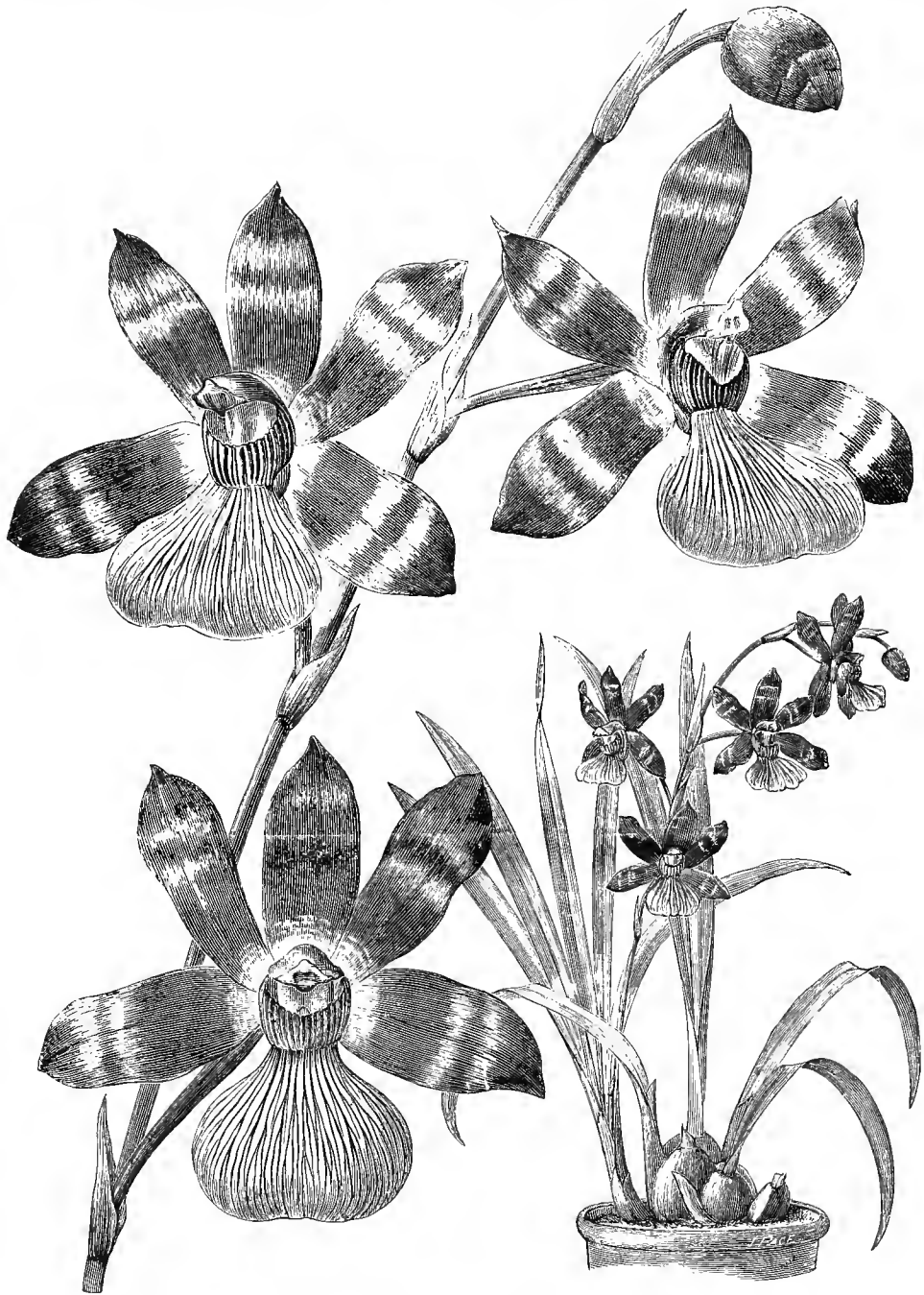


FIG. 259. *ZYGOPETALUM SEDENI*, showing Habit and detached Inflorescence.

**Z. pictum** (painted). Much like *Z. discolor*, differing chiefly in the lip, which is rhomboid and crisped, yellowish-white, with numerous, broad, marginal, dark purple lines, brownish basal borders, and a greenish, tablet-like, basal callus, with two teeth

lately veined with lilac-rose, and exhaling a perfume similar to that of the Hyacinth. *l.* ensiform, above  $\frac{1}{4}$  ft. long. Brazil, 1875. Possibly this may be a large-flowered form of *Z. Mackayi*. (R. H. 1873, 191.)

**Zygopetalum**—continued.

**Z. Roëzii** (Roëz's). *f.* variable; sepals and petals usually white, beautifully tipped with violet-lilac or purplish-rose, the former oblong, the latter cuneate-obovate; blade of the lip, excepting the callus, of the same showy colours. Ecuador, 1874. Allied to *Z. Dayanum*. Stove. SYN. *Pescatorea Roëzii*.

**Z. Rollissoni** (Rollisson's). *f.* sepals and petals pale yellow; lip whitish, spotted with crimson, the middle lobe oblong, apiculate, the lateral ones narrow-ovate, acute, resembling two erect bars standing up from the base; scapes deflexed, from the lower axils. Autumn. *l.* oblong-lanceolate, venose. Pseudo-bulbs roundish, compressed, bearing about two leaves at the top and other accessory ones from the base. Brazil, 1843. Intermediate. SYNS. *Maxillaria Rollissoni* (B. R. 1838, 40), *Promenaea Rollissoni*.

**Z. rostratum** (beaked). *f.* 6in. deep; dorsal sepals and two petals whitish at base, then green, marked in the centre with dull brownish-purple, linear-lanceolate, 3in. long; lip nearly 3in. long, ovate, recurved, white, yellowish behind the disk, which bears a small, pale lilac-purple frill or ruff, about ten lines of the same colour radiating from it towards the front; scapes radical, one or two-flowered. *l.* lanceolate, acute, plaited. Rhizome creeping, forming compressed pseudo-bulbs at intervals. This species requires more heat and moisture than any other. Stove. (B. M. 2819; W. O. A. ii. 78.) SYN. *Zygosepalum rostratum* (Ref. B. 106).

**Z. Russellianum** (Russell's). *f.* large, freely produced; sepals and petals cream-coloured, tipped with reddish-purple; lip of the same reddish-purple tint, the yellow ruff or callus being fifteen lamellae with deep crimson-purple angles; column yellowish in front, with a lemon-yellow area at base. Ecuador, 1878. Allied to *Z. Dayanum*. Stove. SYN. *Pescatorea Russelliana*.

**Z. sanguinolentum** (dark bloody). *f.* pale straw-coloured or greenish, with dark bloody spots; sepals broadly lanceolate, petals oblong-ovate, both acute; lip cuneate-flabellate, lobulate at apex, undulate, denticulate, the basilar callus dark purple at base, bidentate at apex. *l.* distichous, cuneate-lanceolate, acute, glaucous. Roots adventitious, cylindrical. Caracacas. Intermediate. SYN. *Kefersteinia sanguinolenta* (R. X. O. i. 25, i.).

**Z. Sedeni** (Seden's). *f.* large, in bold racemes; sepals and petals deep purplish-brown, evenly bordered with pale green; lip rich bluish-purple, deeper coloured towards the base, and breaking out into forked veins near the margin, broad, emarginate, the ruff bluish-purple, bold. *l.* narrow-lanceolate, plaited. 1874. A hybrid between *Z. Mackayi* and *Z. maxillare*, and much resembling the latter. See Fig. 259, for which we are indebted to Mr. Wm. Bull. (F. M. ser. ii. 417; R. G. 1883, 280.)

**Z. stapelioides** (Stapelia-like). *f.* sepals and petals greenish-yellow, transversely barred and spotted with dark purple, roundish-ovate, acute; lip deep purple, oblong, three-lobed, the lateral lobes linear, erect, the terminal one ovate-oblong, hooded at base, the margins paler and cross-barred; peduncles deflexed, two-flowered. July to September. *l.* thin, lanceolate, light green. Pseudo-bulbs small, ovate, tetragonal, one or two-leaved. Brazil, 1843. Intermediate. SYNS. *Maxillaria stapelioides* (B. M. 3877; B. R. 1839, 17), *Promenaea stapelioides*.

**Z. stenochilum** (narrow-lipped). A synonym of *Z. crinitum*.

**Z. triumphans** (triumphant). *f.* fleshy; sepals and petals snowy-white, blue at apex, the former elliptic, apiculate, the latter narrower, cuneate at base; lip blue-black, with a ligulate claw, oblong-rhomboid emarginate, minutely papillose in the anterior portion; peduncles thick, terete, 4in. to 6in. long. *l.* few, distichous, Grass-like, lanceolate, acute. New Grenada. Stove. SYN. *Pescatorea triumphans* (R. X. O. i. 11).

**Z. velatum** (veiled). *f.* yellowish-white, solitary, fragrant; dorsal sepal and petals broadly ovate, acute, the lateral sepals narrow, all spreading upwards; lip margined with crimson, broad, flat, five-lobed, the disk radiately striated with numerous purple-crimson bars; at the base is a stout callus resembling a semicircular row of five to seven teeth; scape rather stout, shorter than the base. *l.* few, oblong-ligulate, acute, 9in. long. New Grenada, 1865. Intermediate. SYN. *Warscewiczella velata* (B. H. 1878, 10, f. 4; B. M. 5582; R. X. O. i. 23, f. 1).

**Z. velutinum** (velvety). A synonym of *Z. intermedium*.

**Z. violaceum** (violet). *f.* of a deep rich violet, tipped with greenish-yellow, melting downwards into white, 2in. to 3in. across; sepals and petals curved in at the points, crisped; lip united to the pouch of the lateral sepals by a short, narrow foot; column large, fleshy, curved at apex. *l.* 8in. to 9in. long, erect, acute, tufted. British Guiana, 1835. Stove. SYNS. *Bollea violacea* (R. X. O. 66, iii.), *Huntleya sessiliflora*, *H. violacea*.

**Z. Wailiesianum** (Wailies'). *f.* of moderate size, scented like Sweet Peas; sepals and petals white or cream-coloured; lip white, stained along the centre with violet, having at the base a crest of five radiating, violet, finger-like bars, which are free except at their origin. Autumn. *l.* dark, evergreen. Brazil. Stove. (B. H. 1878, 10, f. 1; L. & P. F. G. i. p. 73.) SYNS. *Warrea Wailiesiana*, *Warscewiczella Wailiesiana*.

**Z. Wallisi** (Wallis'). *f.* 3in. across; sepals and petals creamy-white, tipped with bluish-violet, the former oblong, apiculate, the latter rhomboid; lip deeper violet, margined with white, oblong, retuse, furrowed, the ruff of seventeen keels white,

**Zygopetalum**—continued.

tinted in front with purple; column white, banded with dark violet at base; scapes short, axillary, one-flowered. *l.* lorate, acuminate. Ecuador, 1869. Greenhouse. SYN. *Pescatorea Wallisi* (F. d. S. 1828).

**Z. Wendlandii** (Wendland's). *f.* 4in. to 5in. across; sepals and petals white, lanceolate, somewhat twisted; lip white, blotched and lined with violet-purple, ovate-cordate, many-lobed, much undulate at the margins, the ruff of seven to nine violet-purple ribs; peduncles stout, axillary. August and September. *l.* tufted, distichous, oblong-ligulate. Costa Rica. A handsome, bulbous species. Stove. SYN. *Warscewiczella Wendlandii*.

**Z. W. discolor** (discoloured). *f.* solitary, deliciously scented; sepals and petals yellowish-green; lip white, with a large, bright violet blotch in the centre, much crisped and minutely lobed at the margin, 1 1/2in. broad; peduncles axillary. *l.* light green. Costa Rica. SYN. *Warscewiczella Wendlandii discolor* (W. O. A. iii. 126).

**Z. xanthinum** (yellow). *f.* yellow, deeper-coloured towards the centre; sepals and petals oblong, acute, spreading; lip oblong, three-lobed, the lateral lobes profusely spotted, erect, linear, entire, the middle one bilabiate with the upper lip fleshy and five-toothed; bracts cucullate; scapes ascending, one-flowered. *l.* narrow-lanceolate. Pseudo-bulbs oval, tetragonal. Brazil, 1843. Intermediate. SYNS. *Maxillaria xanthina*, *Promenaea xanthina*.

**ZYGOPHYLLEAE.** A natural order of shrubs or herbs, very rarely trees, principally inhabiting the hot and extra-tropical regions of both hemispheres. Flowers white, red, or yellow, rarely blue, hermaphrodite; sepals five, rarely four, generally imbricated; petals five or four, very rarely wanting, hypogynous, free, imbricated, or twisted, rarely valvate; disk convex or depressed, rarely annular, inconspicuous, or wanting; stamens usually double, or rarely treble or equal to the number of petals, biseriate, the outer opposite the sepals; anthers versatile, longitudinally dehiscing; peduncles usually one or two, springing from the axils of the stipules, ebracteate or rarely bibracteolate, one-flowered. Fruit coriaceous or crustaceous, sometimes septical and dividing into two to ten cocci, sometimes a loculicidal capsule. Leaves opposite or alternate from the suppression of one, stipulate, bifoliate or pinnate, rarely three-foliate; leaflets entire, dotless, sometimes connate; stipules twin, persistent, sometimes spiny. The wood of *Guaiacum* is very hard, and heavier than water; it is employed by cabinet-makers for the manufacture of objects exposed to weight or friction. The order embraces seventeen genera, and about 100 species. Examples: *Chitonia*, *Guaiacum*, *Zygophyllum*.

**ZYGOPHYLLUM** (from *zygon*, a yoke, and *phylon*, a leaf; alluding to the pairs of leaflets). Bean Caper. Including *Fabago* and *Rapera*. ORD. *Zygophylleae*. A genus comprising about fifty-four species of small, often prostrate shrubs, under-shrubs, or perennial herbs, all, with one exception, confined to the Old World, and mostly found in Australia and South Africa. Flowers white or red, mostly with a purple or red basilar spot; calyx four or five-parted, imbricated; petals four or five-clawed, imbricated and twisted; stamens eight or ten, longer than the petals; peduncles one-flowered, axillary, solitary or rarely two together. Fruit four or five-angled or four or five-winged, capsular. Leaves opposite; leaflets two, very rarely one, often fleshy; stipules two, often spiny. A selection of the introduced species is here given. They should be grown in a compost of loam, peat, and sand. Except where otherwise stated, all require greenhouse treatment. Propagation may be effected by cuttings, inserted in sand, under a glass; or by seeds, when these are obtainable. *Z. Fabago* grows freely in any sunny spot, in dry, well-drained soil.

**Z. album** (white-flowered). *f.* on erect pedicels; petals white, crenate, blunt. October and November. *l.* leaflets cylindrical, club-shaped, fleshy, cobwebby. Stem procumbent. North Africa, 1779. (S. F. G. 371.)

**Z. scarlettinum** (scarlet-flowered). *f.* on erect pedicels; petals scarlet, acuminate. August. *l.* leaflets cylindrical, fleshy, smooth. *h.* 1ft. 1823. North Africa and Seinde.

**Z. cordifolium** (cordate-leaved). *f.* four or five-cleft; petals yellowish, broad, thrice as long as the calyx; peduncles about as

**Zygophyllum**—*continued*.

long as the leaves. October. *l.* simple, sessile, mostly subcordate at base, some oblique at base, or half-cordate. Stem lift. or more high, ash-coloured. South Africa, 1774.

**Z. Fabago** (Fabago). Syrian Bean-Caper. *fl.* on erect pedicels; petals yellow, but of coppery-brick colour at the base, undivided. July to September. *l.*, leaflets flat, smooth, obovate. Root thick, fleshy, striking deeply into the ground. *h.* 1ft. to 4ft. Syria, Tauria, Persia, Afghanistan, &c. Hardy perennial. *SYN. Fabago major* (S. B. F. G. ser. ii. 226).

**Z. foetidum** (foetid). *fl.*, petals orange-yellow, with a purple spot at base, four times longer than the pubescent calyx; peduncles nodding,  $\frac{1}{2}$  in. long. June. *l.*, leaflets obovate, obtuse, oblique at base, the larger ones 1 in. to 1½ in. long; petioles  $\frac{1}{2}$  in. long. Branches herbaceous. *h.* 2ft. to 4ft. South Africa, 1790. Subshrub. *Z. insuave* (B. M. 372) is a mere form of this species, with narrower petals.

**Z. fruticosum** (small shrub). *fl.* four-cleft; petals yellow; filaments subulate, without wings. July. *l.*, leaflets obliquely oblong or lanceolate, rarely ovate. Australia, 1820. A low, diffuse or divaricately-branched shrub. *SYN. Ræpera jabagi-folia*.

**Z. f. bilobum** (two-lobed). *l.*, leaflets narrow, continuous with the petiole. *SYN. Ræpera aurantiaca*.

**Z. fulvum** (fulvous). *fl.*, petals fulvous or yellow, with a red basal blotch, twice as long as the calyx; peduncles  $\frac{1}{2}$  in. to 1 in. long, reflexed after flowering. July. *l.* sessile; leaflets lanceolate-ovate, acute, somewhat narrowed at base, the larger ones ten to twelve lines long, very fleshy. *h.* 3ft. South Africa, 1713. (B. M. 2184, under name of *Z. sessilifolium*.)

**Z. insuave** (disagreeable). A form of *Z. foetidum*.

**Z. Morgsana** (Morgsana). *fl.* nodding, four or five-cleft; petals yellow, obovate, thrice as long as the glabrous calyx; peduncles  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. long. August. *l.* shortly petiolate, the larger ones

**Zygophyllum**—*continued*.

1 in. to 1½ in. long; leaflets obovate, obtuse, sub-oblique at base. Stem terete. *h.* 4ft. South Africa, 1732.

**Z. spinosum** (spiny). *fl.* five-cleft, nodding; petals yellowish or cream-coloured, red-streaked from base to middle or with a purple spot at base, twice or thrice as long as the calyx; peduncles equalling or exceeding the leaves. July. *l.* sessile; leaflets linear, flat or with the margins slightly revolute, acute, fleshy, four to ten lines long. Branches grey. *h.* 1ft. to 2ft. South Africa, 1830.

**ZYGOSEPALUM ROSTRATUM**. A synonym of *Zygopetalum rostratum* (which see).

**ZYGOSTATES** (from *zygos*, a yoke, and *statos*, standing; alluding to the two processes which stand out horizontally from the base of the column, and together somewhat resemble a yoke). *SYN. Dactylostyles*. *ORD. Orchideæ*. A small genus (three or four species) of dwarf, epiphytal, stove Orchids, found in Brazil. Flowers small, racemose, on axillary peduncles; sepals sub-equal, free, spreading or reflexed; petals similar or broader; lip continuous with the base of the column, spreading, concave, undivided, with an incurved appendage at base; column arched, semi-terete. Leaves fleshy or coriaceous; sheaths scarcely thickened into pseudo-bulbs. Only one species has been introduced. For culture, see **Burlingtonia**.

**Z. Greeniana** (Green's). *fl.*, sepals oblong, obtuse; petals white, ovate, toothleted; lip white, streaked with green, foveate, rounded; peduncles short, two-flowered. *l.* cuneate-ligulate, trigonal, fleshy, superposed. Pseudo-bulbs minute, somewhat pear-shaped, one-leaved. 1869. A curious little plant.

*Plants which have been introduced to cultivation in this country since the publication of the various portions of this Work will be described at the end of the Supplement.*

## DATES OF PUBLICATION.

THE DICTIONARY OF GARDENING having been first issued in the form of Monthly Parts, it is necessary to give here the extent of each part, and the date of its publication. This Table will be found useful in determining the first adoption of a new name, and for other purposes. In several instances, Plants will be found described under their correct names for the first time in any horticultural work.

A	to	Allium	March,	1884	Cleisostoma	to	Corylus	October,	1884
Allium	"	Apple	April,	"	Corylus	"	Dahlia	November,	"
Apple	"	Aubergine	May,	"	Dahlia	"	Dipladenia	December,	"
Aubrietia	"	Black Fly	June,	"	Dipladenia	"	Eritrichium	January,	1885
Black Fly	"	Caleana	July,	"	Eritrichium	"	Freyinetia	February,	"
Caleana	"	Celosia	August,	"	Freyinetia	"	Gleichenia	March,	"
Celosia	"	Cleft	September,	"	Gleichenia	"	Hedera	April,	"

**Dates of Publication**—*continued.*

Hedera	to	Hypericum	May,	1885	Populus	to	Pteris	August,	1886
Hypericum	,,	Karatas	June,	,,	Pteris	,,	Red Lychnis	September,	,,
Karatas	,,	Leucoium	July,	,,	Red Maggot	,,	Rosa	October,	,,
Leucoium	,,	Lychnis	August,	,,	Rosa	,,	Sarcocbilus	November,	,,
Lychnis	,,	Melasphæra	September,	,,	Sarcocbilus	,,	Seaside Grounds	December,	,,
Melasphæra	,,	Mormodes	October,	,,	Seaside Grounds	,,	Skimmia	January,	1887
Mormodes	,,	Nectarine	November,	,,	Skimmia	,,	Sprengelia	February,	,,
Nectarine	,,	Oak Galls	December,	,,	Sprengelia	,,	Strychnos	March,	,,
Oak Galls	,,	Orange	January,	1886	Strychnos	,,	Thelebolus	April,	,,
Orange	,,	Ozothamnus	February,	,,	Thelebolus	,,	Tradescantia	May,	,,
Pachidendron	,,	Pea	March,	,,	Tradescantia	,,	Tulipa	June,	,,
Pea	,,	Peronospora	April,	,,	Tulipa	,,	Verbena	July,	,,
Peronospora	,,	Phytophthora	May,	,,	Verbena	,,	Viscum	August,	,,
Phytophthora	,,	Pleione	June,	,,	Viscum	,,	Xerotes	September,	,,
Pleios	,,	Populus	July,	,,	Xerotes	,,	Zygostates	October,	,,















